

# Building

# The

# Cardboard

# Home

*by Jack Henstridge*



Dear Reader,

The most frequently asked question in the many letters I've received is — "Can this type of wall be used on a base other than a slab?" — answer — Certainly.

In the early houses I saw (built in the mid to late 1800's) the wall was built on a stone foundation, either a "footing" or a full basement wall. The stone was laid up in the same LIME MORTAR as used in the stackwood wall.

The important thing, again, none of the wood was in contact with the ground.

I think that the stone wall method is the only feasible route — from an economic standpoint. This structure was the same width or slightly larger than the stackwood walls, thus providing a solid base to build on. Pouring a cement wall the required thickness would be quite expensive.

Therefore it is no problem to put a basement or just a crawl space under your proposed house if you so desire. The only reason I used a "slab" was simply a matter of time and cost.

In the chapter on design, it should be quite simple to build a cellar under any of the "round houses" using the rock wall technique. Just a matter of modifying the floor plan to provide a stairwell to the basement. The best place is in the area where the "utility room" is shown.

The next question concerned width of the wall. Nine inches is the minimum width for the exterior wall. As far as I'm concerned anything over nine inches is up to you. In Northern Alberta they go to two feet — personally I don't think this is necessary either for strength and/or insulating value (it must be fantastically strong!) A foot or a foot and a half should be plenty. But if you have lots of wood . . . what the heck!

The only thing is the fact that the thinner your wall is, the tighter a curve you can make (minimum is eight foot radius with a nine inch block). But if you are going to square corners, the width is no problem — just heavier to handle.

The third question dealt with covering the wall for protection from the elements. This is what I found. The barns and out buildings built with this method are still standing after 100 years and the walls are not covered.

However, the people wanted something a little more "finished" for themselves. They would apply plaster directly to the inside surface — no vapor barrier — no nothing — just trowel it on and Presto — a finished, smooth interior wall. The Exterior of the wall was "strapped" and either clap-board or shingle was applied. The only thing about them is that they look just like ordinary houses. Personally I like the "stone" look of the "unfinished" wall.

Most of the other questions asked were already covered in the book.

Remember — if you run into problems — drop me a letter; or if really in a bind — phone me at area code 506-488-2477.

Send me a photo of your building and I'll send you a real fancy (I'm still trying to come up with a design) certificate that you can hang on the wall, stating that you are a member of ANOFAWM (Ancient and Noble Order of Free thinking and Accredited Wood Masons). We might have started a whole new group — complete with a secret handshake (how about a fistful of wet mortar?).

If you've got any suggestions on this idea let me know — could be a lot of fun.

Love,

Jack Henstridge, MMS  
(Master Mortar Stuffer)  
R.R. 1, Oromocto, N.B., Canada  
E2V 2G2



# **BUILDING the CORDWOOD HOME**

**By Jack Henstridge**

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John Inman, who saw a "friend in need."

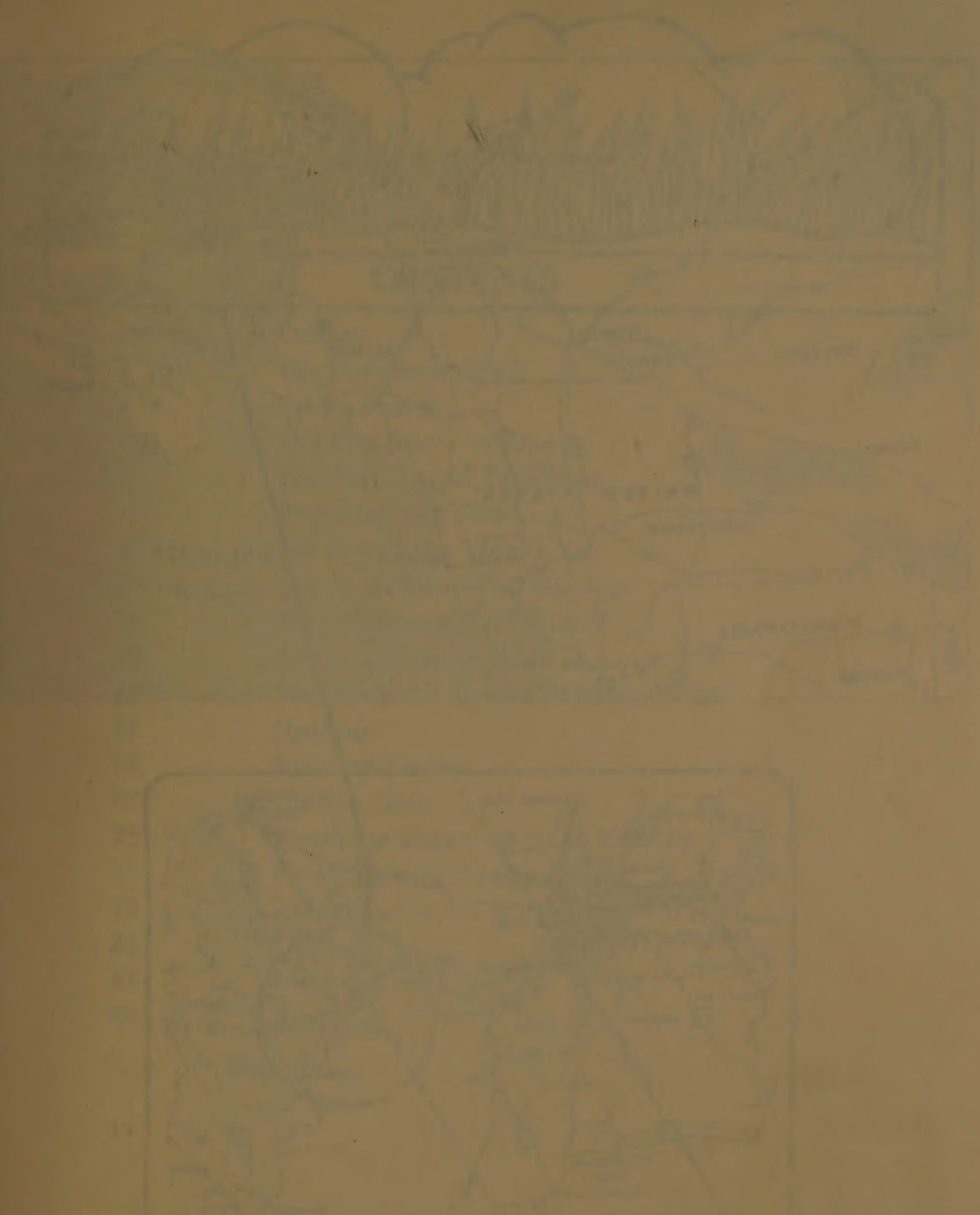
Roger Smith—photographer, "par excellence."

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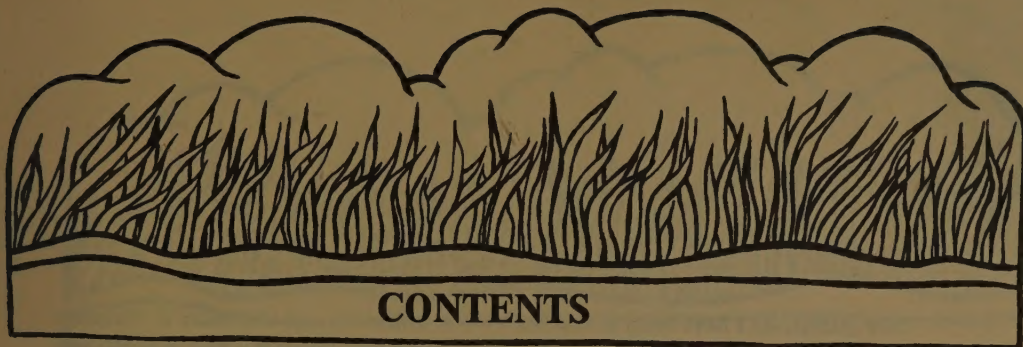




“Love is not looking at each other ... Rather, it is looking in the same direction together.”







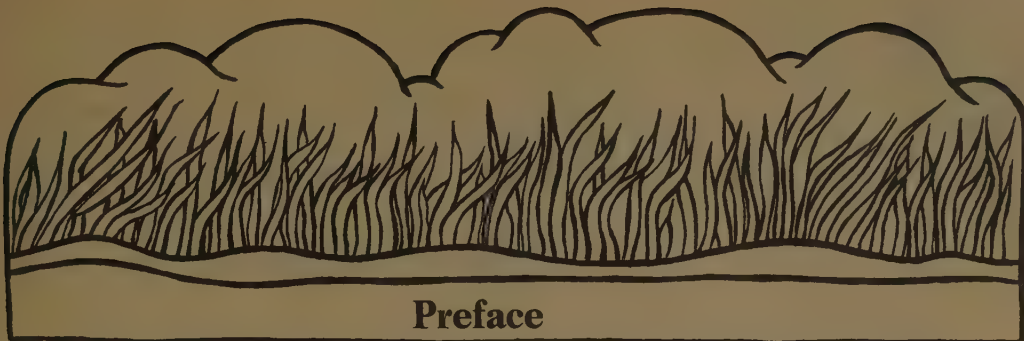
|    |                                   |
|----|-----------------------------------|
| 1  | Preface                           |
| 3  | The Cordwood Wall                 |
| 7  | Up Against It                     |
| 9  | The Fog Starts to Clear           |
| 13 | The Tall Timber Operation         |
| 17 | Preparing the Site                |
| 27 | Not Out of the Woods Yet          |
| 29 | The Total Cordwood Concept        |
| 31 | Floor Plan and Elevations         |
| 35 | Constructing the Wall             |
| 47 | Windows, Doors and Dividing Walls |
| 57 | Roofing                           |
| 65 | Pyramid Power                     |
| 67 | Cutting Glass                     |
| 73 | Plumbing, Electricity and Heating |
| 75 | Patching and Chinking             |
| 79 | If We Had to Do It All Again      |
| 81 | Designs                           |
| 87 | Photo Album                       |
| 95 | Summary                           |

The quotations I have used in this book were written by one of France's "aviation Pioneers," Antoine de Saint Exupery. He wrote some very beautiful and inspirational words. What I have quoted here is only a scratch on the surface. His works include *Night Flight*, *Wind Sand and Stars*, *Southern Mail*, *Flight to Arras*, *Airman's Odyssey*, *Letter to a Hostage*, *Wisdom of the Sands* and *The Little Prince*. They are hard to find but well worth the effort.

No one knows what really happened to him—in 1944 he disappeared over the Mediterranean, while flying with the U.S. Airforce. The world lost an "inspired" man.

"What all of us want is to be set free. The man who sinks his pickaxe into the ground wants that stroke to mean something. The convict's stroke is not the same as the prospector's, for the obvious reason that the prospector's stroke has meaning and the convict's stroke has none. It would be a mistake to think that the prison exists where the convict's stroke is dealt. Prison is not a mere physical horror. It is using a pickaxe to no purpose that makes a prison; The horror resides in the failure to enlist all those who swing the pick in the community of mankind.

We all yearn to escape from prison."



## Preface

My objective in putting this book together is to provide anyone who is contemplating using this type of construction with an idea of what is involved. I have tried to put down on paper what we have learned by trial and error, and thus make it the sort of book I wish I'd had before I started. I hope you find it helpful.

The main reason that we have a low cost house is that very little "energy" was used in the production of the main building material. After all, how much oil and electricity does it take to grow a tree? Once you start to cut that tree into smooth lumber, you start using large amounts of "Manufactured Energy". This type of energy is very expensive.

We have been led to believe that we must have long straight boards and planks to build a house. This requires the cutting down and sawing up of long straight trees. As the demand for housing increases, the demand for this type of tree also increases and thus their numbers decrease. This means only one thing—their value must increase.

The trees that were not long and straight were usually knocked down and left in the woods to rot. Now they are being hauled out, chopped up into tiny pieces and made into "chipboard", "particle board", "flakeboard", etc. This process requires even larger amounts of manufactured energy—so the cost climbs even higher. Other contributing factors to the rising costs are the increased amounts of expensive machinery necessary and, of course, the additional labor required.

It all adds up to one big vicious circle. In all the confusion, we have lost sight of the original objective, which was to provide ourselves with a comfortable low-cost dwelling.

By using this method of construction, the benefits are twofold. First, we have a readily available, low-cost building material. The second and perhaps the most important, by removing the dead trees, the diseased trees, the trees that have been blown down, and the crooked and crowded trees, we are giving the others a much better chance to grow long and straight. They can then be harvested only when absolutely necessary. Their numbers should increase.





Some skeptics have said to me, "It ain't going to last!" (in spite of the fact that along the Ottawa River Valley there are houses that have stood for over 100 years that were built using this method.) I can only answer with the question "How long do you want it to last?"

If you have a house that cost you \$35,000, and with a great deal of luck lasts say 50 years, it cost, not counting interest, \$700.00 per year.

\$35,000.00 house costs today a minimum of \$25.00 per sq. ft. This gives you a house that has 1400 sq. ft.

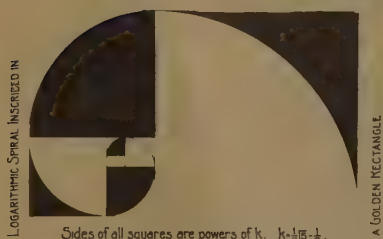
1400 sq. ft. of cordwood house at \$7.00 per sq. ft. (which is a very high figure) would cost you \$9,800.00.

If you built a cordwood house and it cost you \$10,000.00, and using the same yearly cost figure as for the other one, it could fall down in 15 years (which it won't if you build it right) and you have saved yourself \$25,000.00 (again not counting interest.) Even at today's rate of inflation, that is more than enough to build another one!

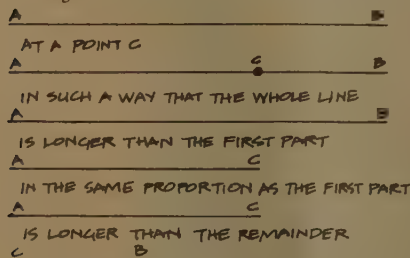
This method of construction has been around for a very long time. I think that we should pause every so often and take a long hard look back along the road we have travelled. Who knows what other questions we might be able to find the answers to?

As my friend Jack Jaynor used to say to me when I would get "boggled down" trying to work out the details when I was drawing up the plans for the house—"Hell—they built the pyramids didn't they!"

## DIVINE PROPORTION



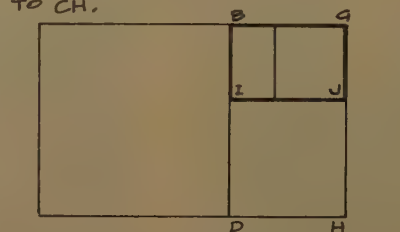
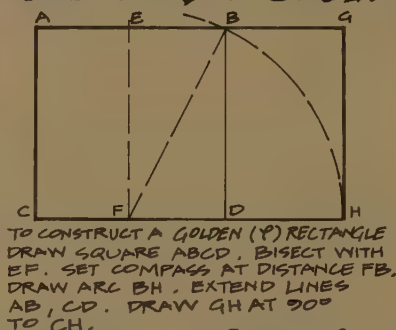
The *Golden Section*, or *Divine Proportion* said by Kepler to be "one of the two jewels of geometry," and considered by Plato (in *Timaeus*) to be the key to the physics of the cosmos. This mathematical relationship appears repeatedly in growth patterns in nature, and has fascinated mathematicians and artists for thousands of years. The Golden Section, or (P) as designated by the Greeks, is obtained by dividing a line



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...NOW IF YOU DRAW A SQUARE IN BGDH, YOU CREATE ANOTHER GOLDEN RECTANGLE BGJH, ETC...

Egyptian king as the hypotenuse of a sacred 3-4-5 triangle formed by a snake. Schwaller de Lubicz shows the king as split into a P+1 proportion by the phallus. The king's raised arm gives a 6/5, or 1.2 x P proportion, which is exactly 3.1416, or pi.



From *Secrets of The Great Pyramid*



## The Cordwood Wall

This method of construction has had many names tacked on to it. Piled wood wall, stackwood wall, stackwall, firewood wall and so on. I call it the "Cordwood Wall" because it looks like the numerous piles of wood cut for the pulp industry in this area, which are generally referred to as "Cordwood".

Who built the first Cordwood wall? That is like asking, when did man first come out of the caves, because the two questions are synonymous. It is one of those "natural" structures.

When we study any of the so called primitive societies today, we find a variation of the so called "Cordwood" wall. It was around a long time before they tacked the name "Cordwood" on it. One of the interesting things that happens to you when you step inside a dwelling that has curved instead of square corners is that it somehow feels right, it feels comfortable; it feels secure, and you feel like part of it.



Why man started building structures with square corners I do not know, except perhaps because it was some sort of "Ego trip". Nature does not build straight lines or square corners. All creatures on this planet with the exception of "civilized" man build their homes with round corners not square ones. So man wanted to be different, he wanted to be "civilized". He didn't want to be like the rest of the creatures, but wanted to be above them, because he was so much better. He had such superior knowledge, he could cope with living in a "nest" with square corners. Sure it wasn't as comfortable, but it definately did set him apart from the other creatures!

Some of the Natural (I prefer "Natural" to "Backward" or "Primitive") societies didn't move into those square boxes, they continued to build round "nests". The natives of the south sea islands, the Africans, the Eskimo, and the Indians, all of the natural societies built or are still building round corners. Just take a look at what has happened to these people once they are dragged into the so called Civilized Society. I do not blame it all on the square corner, but it is definately one of the main contributing factors.



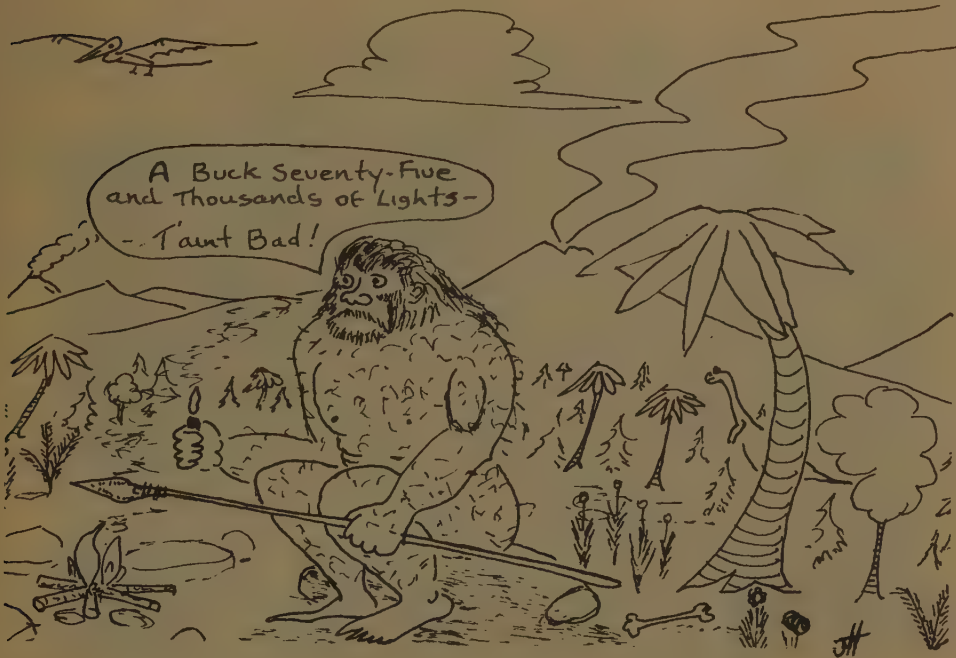
"The shape of our external environment affects our internal environment. Square building and hard corners closing us in tend to produce square, dogmatic, cold thinking. The farther we go from nature, the harder a time we have when we attempt to approach God. In nature there are no cold, hard, sharp angles. Warm and soft and varied are the ways of Divine Mother Nature. When rats are confined in little square boxes, their incidence of insanity increases, substantially. Psychologists and Police are almost unknown in most Natural Societies."

from Woodley Herber Label



So lets go back in time once more and see how "the wall" developed. The most precious thing that early man had, was fire. He soon found out that unless he had a good supply of dry fuel the fire would go out, so he piled the wood up around a central fire. This worked great. Man not only had a good supply of fuel, he soon found that he could get in between the fire and the wood pile and keep warm. He then found out that if he built the pile high enough, he could lay long sticks over the top of it and some broad leaves over the sticks and the rain would not put the fire out. He also found that if he poked mud between the sticks in the pile, he could keep the wind out, too. All he had to do was pile his circle of firewood so that the inside was even. He didn't have any saws or axes back then, so the outside was a veritable pin cushion. His enemies could not get in at him. Man had invented the "Cordwood Wall" or more accurately the "Firewood Wall." He did not need the cave anymore.

The first "settlements" were really just a bunch of Dudes who were assigned the job of looking after the fires. The more of these fire shelters there were, the less chance there was of losing the precious "element." If the fires went out they were in big trouble, there wasn't anyone running around back then saying "a flick of the bic?"



Early Man, because of his three prime motivating drives, ie. Warmth, Food, and Sex, found himself with a crowd on his hands.

Thus "villages" sprang up and the tribal system was born. They could now keep warm, there was a lot of food, so the crowd kept getting larger. They had to have more fire shelters and the saw and axe had not been invented yet. They were running out of short wood! They started piling up long lengths and cross piling them at the ends. Thus, the square corner was invented.

If they had only invented the "Pill" first!

Throughout man's history he has kept rediscovering this type of construction. It is easy to do; by using wood that does not have much commercial value, it costs very little, and the supply is usually quite abundant. So, whenever Man is "Up against it", along comes the "Cordwood" wall.





## Up Against It!

That is exactly where we were the evening of April 26, 1973. I had been working about 200 miles from home and had just been laid-off from a pretty good job as a company pilot, due to a rather serious recession for the company. This was at a bad time for commercial pilots in this area. If it had happened a couple of weeks earlier, I might have been able to get a seat on a Water Bomber or Ag plane or even a fire patrol seat—but everything was filled.

I was getting ready to move back home, my wife Helen was helping me pack, when the phone rang. It was my daughter Heather. Our house was on fire. (Fortunately no one was hurt. She had been preparing supper, when sparks from the chimney had landed on the roof and away it went.)



That was a long 200 mile drive back “Home”. Things looked pretty bad. There we were—no house—no job and the huge sum of \$8000.00 in fire insurance. We had talked several times in the past about up-grading our fire insurance, but I am like the guy who said, “I’m going to stop putting off things—as soon as I get around to it”. Well, we learned the hard way. Make sure your insurance will at least cover the cost of replacing your building. (The main problem to day is that with escalating costs this figure changes almost daily!) We thanked our lucky stars that Helen had at least paid the premium about a month before or we wouldn’t have had that! Like I say—we are feeling pretty down.

Then I remembered the old parable, **“I complained because I had no shoes, and then I met a man who had no feet”**. We came to the conclusion that we were not too badly off. Let’s see what we can do with what we’ve got.



The first thing we had was the greatest fire in the history of Upper Gagetown. That old house lit the sky up "something fierce". People came from miles around and stayed all night. What a blaze! The house was a beautiful old place—about 150 years old, three stories, and all wood. I had put the plumbing in it a number of years before so I knew the fantastic workmanship that had gone into it. All the wood was as dry as tinder. The volunteer Fire Department from Gagetown (10 miles away), the Oromocto Fire Department (18 miles away), and the Provincial Forestry Department tried their best—but there was no way they could cope with it. The Chiefs of the different Brigades came to me and said that the best thing to do (after several hours) was to let it go, there would be less to clean up. It was kind of heartbreaking, we loved that old place, it had a lot of character.

A lot of the "Old timers" sat there all night, and talked about the people who had lived there in the past. Also, about the time a "Court" was held in the front room, and the time it had been used as a Poll during an early election, and on and on.

We had spent eleven years in it and it had served us well. It was sad to watch it go down.

We moved what was left of our belongings into the old Upper Gagetown Schoolhouse. The local Orange Lodge owned the building and let us use it rent free. We did a lot of soul searching, and decided that we needed a place to live. Everybody wanted to stay in the area because we had a lovely piece of ground on the Saint John River that had not cost us too much. We knew that we could get a pretty good price for it, but where would we be then. Houses cost so damn much money, and there wasn't anything available right then anyway. We figured that there had to be an answer somewhere.

Who build houses when they did not have the money? The answer was simple; the old pioneers! We were better off than they were, afterall—we had \$8000.00. If we could build the house for nothing, that money would go a long way towards food. We decided that this was the route to take.

The old school was just ideal for what came next—the Planning Stage. The two end walls were covered with blackboards, so we started sketching ideas all over the place.



## The Fog Starts to Clear

After a lot of drawing and dreaming and dreaming and drawing, I came up with this particular design. I had the idea that a house should tell a story. It should be a sort of abstract sculpture that you could live in.

As a kid, I had always wanted to own a big ship. I used to daydream about sailing over bounding main, yo heave ho and all that jazz: a vast ye lubbers and so on. That meant that the center of the house would be a ship. But, I also love flying, so let's put wings on the ship. That was the basic concept of our future home, "A Ship with Wings". Now the design started to finalize.

We decided to try to incorporate as many different log building techniques into the structure as possible. Horizontal, vertical and the Cordwood wall. We would then become experts in the field of log cabin building (a potential source of income). We built a scale model, (1/4 inch to the foot) just to see how it would all go together.



there is the ship in the middle with its high pointed bow and rounded stern.





Second Roof Design





Another feature of the house was a bridge right across the livingroom to connect the two little “lofts” on either side. We figured that we could use the model instead of blueprints. Also, it would be easier and cheaper to make changes in the model. Then we could see exactly how it would look. This system worked great.

The next phase of the operation was going to be simple—get the logs.

## The Tall Timber Operation



The search for suitable trees to cut for the job led to the Forestry Station in Gagetown. I had thought that Tamarac would be good for the job. There was not much demand for it and there seemed to be all kinds of it from the air. When I went looking for it on the ground, though, it was a different story.

Sure enough, there were very expansive stands, but what I saw with the exception of a few trees, was not straight enough for my purpose. I decided to check with the Forestry Department to see if they knew of any suitable stands in the Camp Gagetown area and if I could get a permit to cut them. They changed my mind regarding Tamarac as a building material because of the difficulty of working with it and the fact that it grew primarily in swampy ground. Getting it out of the woods would be very difficult.

After much discussion, one of the Rangers, Mr. Gratton asked if I had considered Red Pine.

The Chief, Mr. Woods came up with a fantastic Plan! Bob Nash had a permit to cut on the Crown land and on his particular "block" were some pretty nice stands of Red Pine. I should make arrangements with Bob regarding these trees. So off I went in search of Bob Nash.

Well, Bob made me an offer I could not refuse. He knew the kind of "bind" I was in. I had to cut the trees down and he would "skid" the timbers out of the woods and pile them by the roadside for a small charge per log. (Barely enough to cover his expenses.)

Suddenly, I was about to become "Jack the lumberjack". I had seen pictures of lumberjacks! I had seen the local fellows going to the woods! Heck, all you had to do was cut down the trees! Nothing to it!



If you have not done anything more physically demanding than flying airplanes for the last three years, and pushing a pencil for seven years before that; and you suddenly jump into the middle of the woods with a powersaw and an axe, I am afraid you are in for a big shock. **WORK!** That's it man! **WORK!** And damn hard work.

Fortunately, for me, my back, and my blisters, that gang of "no good useless young punks" came to my rescue. Don't let anyone tell you that the "kids" of today are useless! One young fellow, in particular, should be mentioned—Basil Nash. I don't think I have ever met any one who could work like Basil. We would go into the woods, and cut down the trees, sort of half and half; but, his half always seemed larger than mine (about four times larger).

Eventually, we had the trees all cut down and the limbs and tops off and in came Bob with his "Tree Harvester" to skid the logs out to the roadside. I had thought that cutting down and limbing the trees was hard work, but hooking up the cables that haul out the logs, running after the "skidder", unhooking the cables, running back into the woods, hooking the cables up again was something else, again. It would be hard enough on smooth level ground, but over tree stumps, branches, logs, roots, rocks, pine needles and everything else, it is slightly difficult.

The original plan was to cut the trees, get them skidded to the roadside, and then have them trucked to the site; once there, peel them and grade them, ie. lay them up on piles according to size and let them dry out.



Here, a small problem arose, the trucks we so desperately needed couldn't make it! Hot Damn—that meant that the logs had to be peeled in the woods right away. For those of you who do not know, and plan to do this sort of thing, that is, build a log house, you have to remove the bark right away. If you don't, when the tree dries out you are never going to get the bark off.

We had already started Phase Three, that is, grading up the ground on the site for the laying of the slab, as we waited for the trucks to arrive with the logs. Then we got the news that they couldn't make it. Back to the woods we went, this time armed with a particularly devilish instrument called a "Spud". This instrument is used to remove tree bark, and this we proceeded to do. After the first couple of days, I was ready to chuck the whole thing, because we were not alone in the woods now, there were other little creatures of the forest there to greet us—BLACK FLIES, DEER FLIES, DOG FLIES, MOOSE FLIES, and of course, MOSQUITOES,



As I mentioned earlier, if you want the bark off the trees, take it off right away. We didn't. The first logs we cut were the first ones we peeled and what a job. The bark was starting to stick. The biggest piece of bark we could get off was about the size of a saucer. Believe me, it was pretty discouraging. We decided to try the logs we had cut later and found that it came off pretty quick. So, now it became a race against time. GET the logs peeled before they dried out.

Most of the time, it was just Helen and I who would go to the woods to "commune with nature" (swat flies), but in the evenings and on weekends there was usually a pretty good gang on hand to help feed the little buggers. One would assume that if there were a lot of people, each individual would get fewer bites, but no such luck. Whoever was in control just sent out more bugs. I suppose a perfect example of Supply and Demand. The only problem was that we were the "supply".



We could write a separate report on the value and effect of the various fly dopes on the market but to keep it short—if you can't get a product called "Woodsman"—forget it—you are wasting your money. The others may be O.K. on the patio, but in the woods they are slightly better than nothing at all. Some other things that also work are grease, used motor oil, mud, pitch; take your pick, they all work to some degree. But, when the bugs are hungry, nothing stops them except a good swat.

One day driving back from a trip to Fredericton, I picked up two hitch-hikers. Jon O'Hara and Mark Humont, both from Montreal, on their way to Newfoundland to seek Fame and Fortune. I let them off on the "TransCanada Highway" when I took the ferry across the St. John River to Upper Gagetown. I told them that if they didn't get a lift to come across and they could spend the night in the old school with us and get an early start.

We were just finishing supper when they arrived, after spending several fly-bitten hours trying to get a ride. We were going to the woods to peel logs and they decided to come along and give us a hand. Well, from downtown Montreal to the New Brunswick woods is one hell of a big step, but it didn't take them long to learn the art of log peeling and fly swatting. When we quit for the night, they were both ready for a good sleep. The next morning, bright and early they left on their odyssey.

About two weeks later, who shows up again but Mark and Jon! Newfoundland did not make it and after nearly starving, they decided to "split". Since they were not gainfully employed anyway, they decided to stay and give us a hand for awhile. (I think that deep down they thought we were all completely crazy.) They stayed with us a couple of days, and were there for the last big push and helped peel the last log and roll it on to the skids to dry.







### Do You Dig Man?

As the intended shape of the house was a little different from the usual, some fancy grading had to be done. Then along came Allen J. Coy, known far and wide as "Alley".

Alley can run a bulldozer like nobody's business, you just have to tell him what you want and turn him loose. He did a fantastic job, and what he leveled "by eye", while sitting on that big "D 8" required little or no finishing. However, as I said before, because of the shape, he couldn't do it all with the machine, so it became a pick and shovel operation.

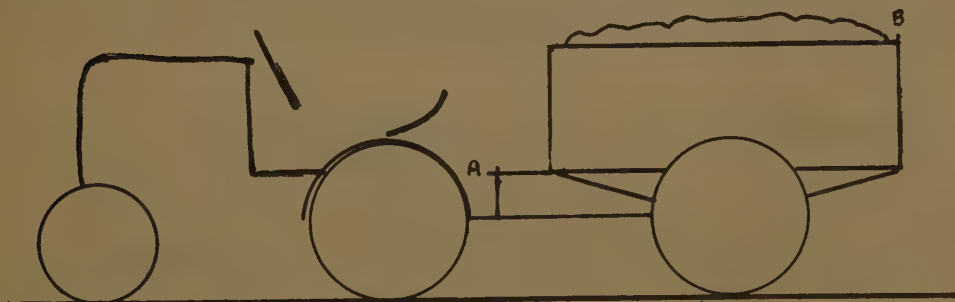
Leo Hartt came to my assistance on this phase, along with the usual weekend crowd. Big Leo, who wasn't gainfully employed at this time, almost daily, when he wasn't looking for work, was there to lend a hand.

We had to dig back twenty five feet into the bank in hard packed rocky gravel and make a vertical face twenty five feet long—in the broiling sun; with the help of those little darlings, the black flies and mosquitoes and a new addition, the infamous "No see'ems". (I'm sure that the "Ole Woodsman" fly dope manufacturers had a fantastic year, we used gallons.)

In order to help our task, I designed and built a little gem that I am proud of, a dumping trailer for our little garden tractor. This thing worked so well, perhaps someone might like to build them commercially. I would, but I am planning on winning the Million bucks in the Sweepstakes so I don't think I'll bother.

### The Dumping Trailer

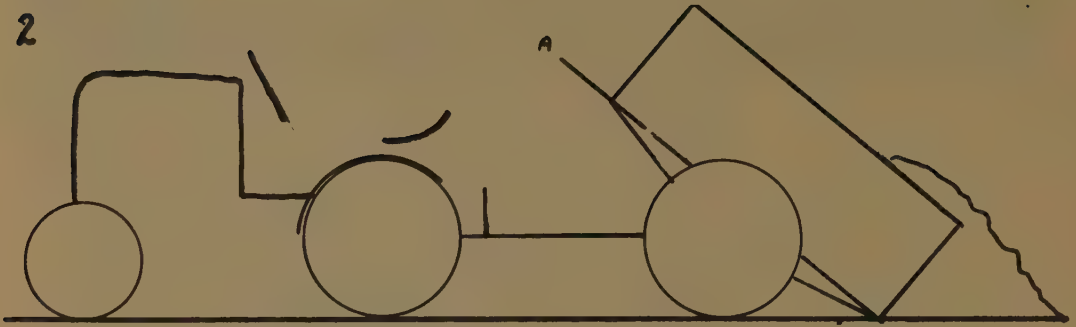
This piece of equipment worked great for me. Not only can you carry a huge load, you can dump it exactly where you want in a nice neat pile. You can also use it to spread the pile around if you are grading or leveling your lawn or garden.



### Operation

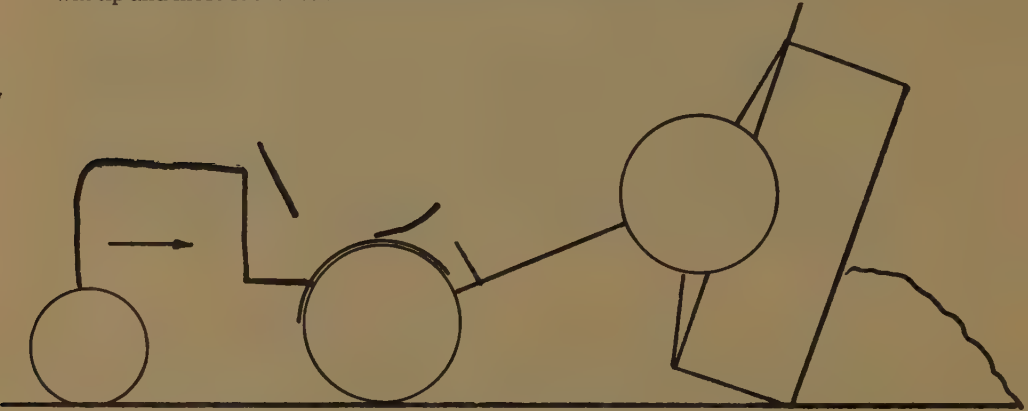
1) Stop the trailer just in front of where you want to place your load. Remove lock pin from arm A and remove tailgate B. Some of the load will fall out so the box stays level.

2



2) Stand on end of trailer to tip it (if you don't mind dirt on your shoes) or lift on arm "A". Box will tip and most of the load will slide out.

3



3) Get back on tractor and put it in reverse. As you back up, the wheels of the trailer lift off the ground and box will go past the vertical leaving the load in a neat pile. If that's all you want to do, put the tractor in forward and you back to #2 position. From the tractor seat grab arm A and pull it down into #1 position and put in the lockpin. (Before you do this make sure the tractor is in Neutral—much safer).

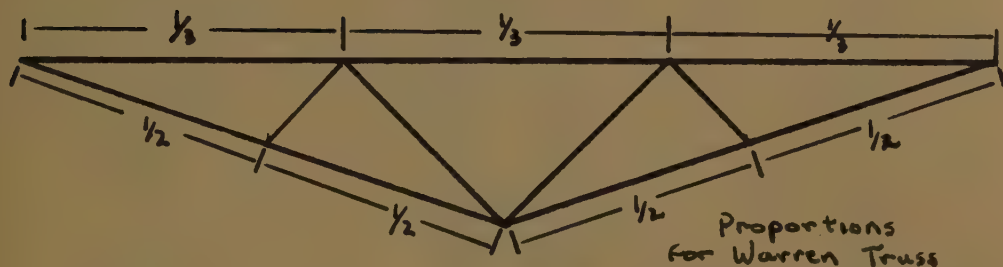
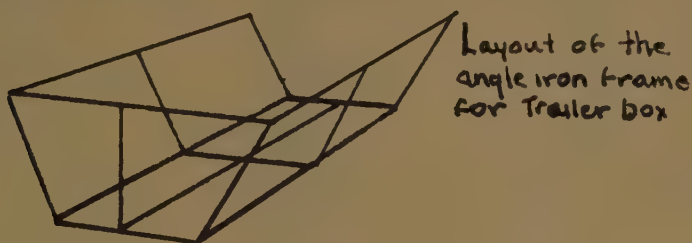
4



4) Perhaps you want to spread the load around and you have someone to help. If there are any kids in the neighbourhood this isn't any problem. They love to ride the trailer, even when it is upside down. All you do is keep backing up as per step 3 and presto—the box is upside down and the open end is now at the front next to the tractor. Get your "Crew" to climb on the back end of the box, put the tractor in forward and with a couple of passes, spread the load just where you want it. With a little practice you can get pretty good at it too.

To go back to hauling, just stand the box on its end by lifting up on arm A and driving off as you did in step 3.

**Construction**—Your costs depend entirely how good a scrounger you are and how much junk you have on hand. The only things I had to buy were the trailer hitch and ball, pair of wheelbarrow wheels and an axle.



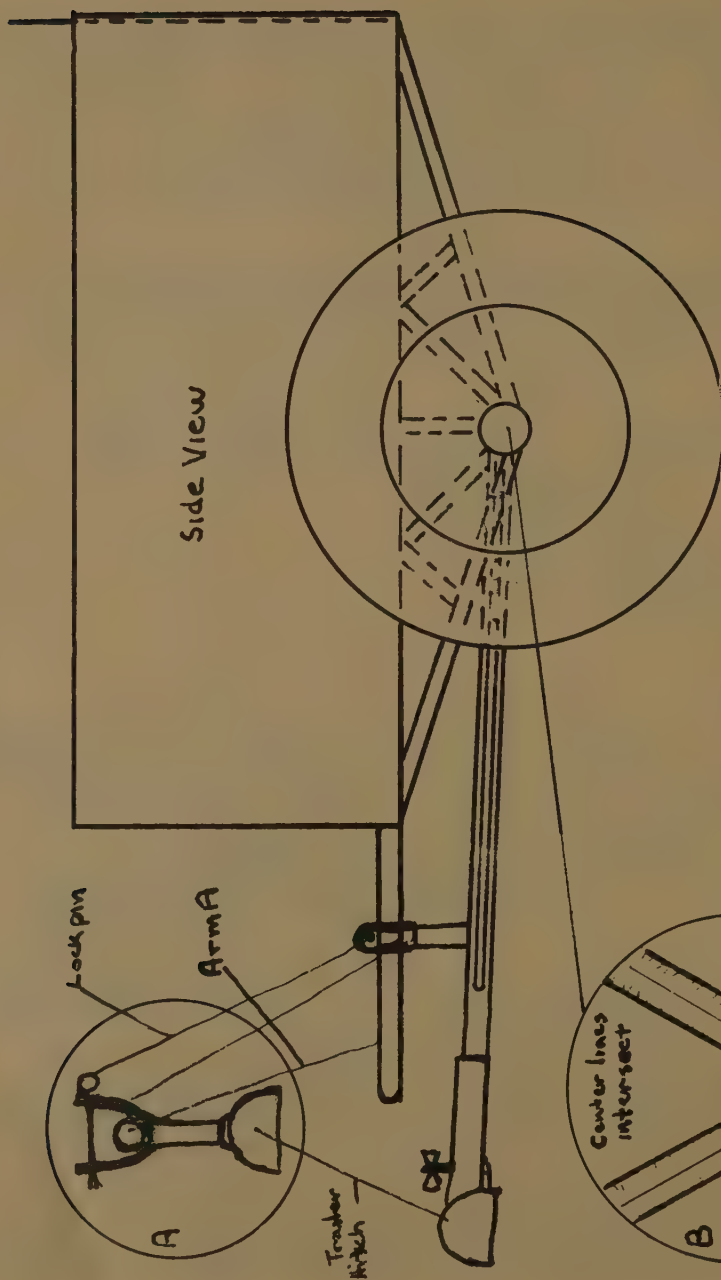
1) The frame for the box was made out of angle iron from old army type bed springs. However a word of caution here. I don't know what they throw in the melting pot when they make those things but they are tough, especially when you go to drill them.

The lining was some thin steel sheeting that I cut to fit and "Pop" rivoted to the frame. The Tailgate was made from a piece of thicker material I found laying around.

I am not a Recycling Freak—it's just that I work on this premise—**What I don't spend, I don't have to earn**—(of course this is due to the fact that I always have a lot of month left over at the end of the money!)

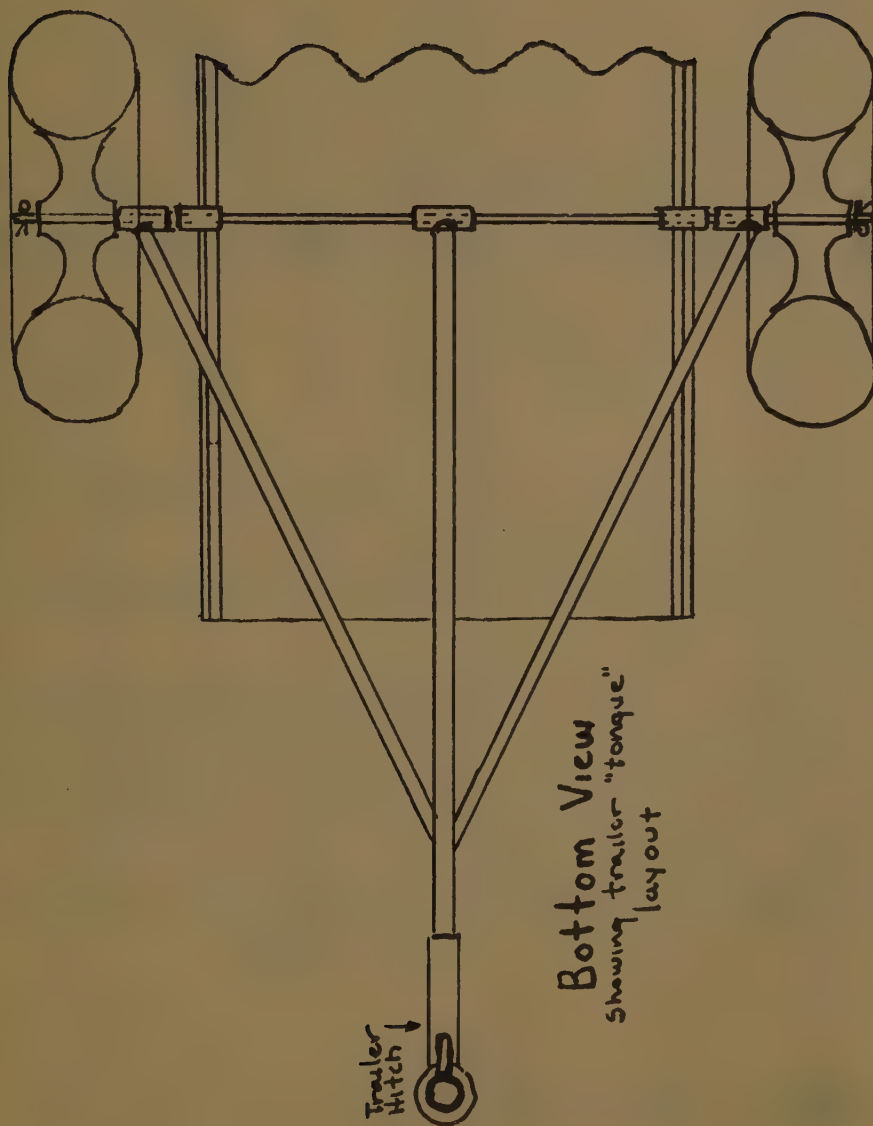
2) The whole secret of this trailer is the tipping carriage that mounts the box to the axle. Basically it consists of two Warren Trusses, only they are built upside down. The theory behind this Truss is simple, whether you are building a Roof, a bridge or, a tipping carriage for a trailer box—the principle for the Braces is the same,  $\frac{1}{2}$  the slope to  $\frac{1}{3}$  the span.

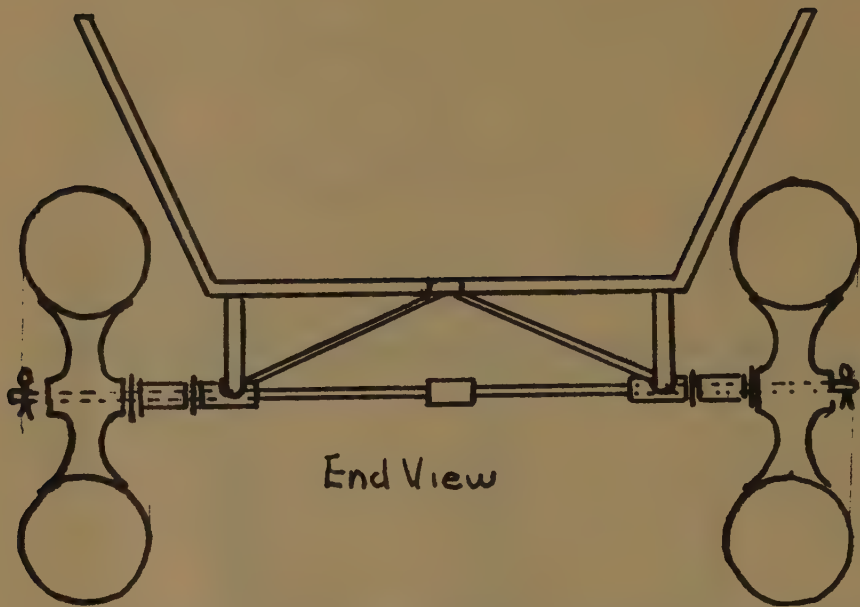




The reason there are no dimensions shown - The Trailer can be scaled up or down from the original in order to suit your own particular Tractor

The box on mine is 4' long, 2 1/2' wide on the bottom





I located a bunch of  $1\frac{1}{2}$ " black iron pipe to make the carriage—this worked out great because the axle for the wheels was  $\frac{3}{4}$ " which just fits inside the pipe. On the drawing I exaggerated it slightly in order to make it more evident.

One important thing to remember when you are cutting the pieces for welding is that when you have a junction, the centerline of your pipe should intersect. This way the load is distributed evenly (see detail B).

Of course you build two, one for each side and weld them to the bottom angle iron on each side of the box. I welded in a  $\frac{3}{8}$ " steel rod from the axle housing to the center angle iron on the box to steady the whole thing. The arm on the front of the box is a piece of 1" pipe.

3) The main tongue or shaft is a piece of 2" pipe and the spreaders are again  $1\frac{1}{4}$ " pipe. All are welded to  $1\frac{1}{4}$ " sleeves the same as the carriage. A word of caution here, when you are assembling it, make sure you have these sleeves in place on the axle. It is no problem at all to weld them crooked and find it impossible to slide the axle through, so remember, if you are new to welding—First we Tack—then we weld.

How you attach the box arm lock is up to you—no great sweat (see detail A how I did it, it works!) Good luck and I hope the trailer works as well for you as it does for me.

Now the slabs had to be laid out and fine graded, this was a long and hot job. To make it level we used the "Old Garden Hose Trick".

# How to use the "Old Garden Hose Trick" to level a piece of ground

Step 1



Make a "Grid" by driving wooden stakes on the area to be leveled. 8 to 10 feet apart is plenty.



Step 2



Make a mark on tree (or other permanent object) This is your "Bench Mark". One person ties hose to tree with hose end at least a foot above Bench Mark. Other person fills hose with water.



Step 3



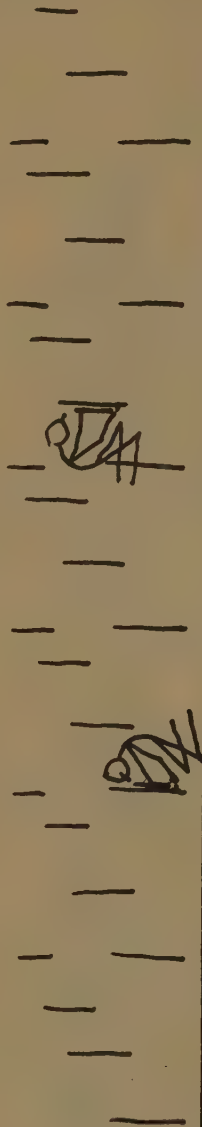
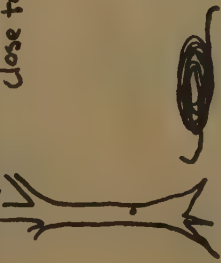
One person keeps eye on level of water in hose. Other person holds hose against stake, raises or lowers his end of hose until level of water is even with Bench Mark. When even, Second person makes mark on stake at level of water in his end of hose.





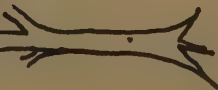
#### Step 4

When all stakes have been marked, measure down same amount on all stakes and mark close to ground. On some you may have to dig.



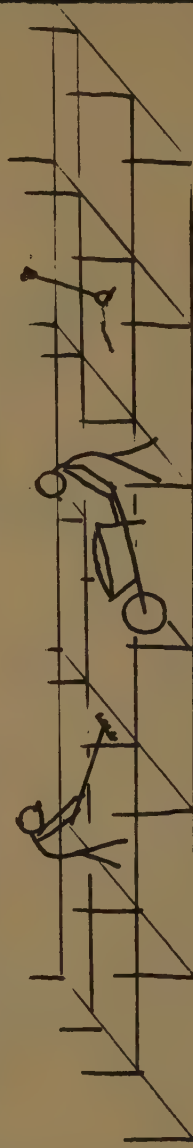
#### Step 5

Connect lower mark on stakes with string. If area to be leveled is very large, it is better to work it in sections rather than "string the whole thing."



#### Step 6

Dig out the high spots and throw them in the low spots. Diagonal strings are not shown. After it is all leveled, water it good and let it sit for a few days and relevel. Roll it, tamp it, jump up and down - anything to compact the soil.



#### Step 7

Remove stakes and string, install forms, place reinforcing steel, pour concrete

311

Meanwhile—back at the Ranch....

Block  
Wall

## Detail of Edge of Slab

2400 PSI Concrete 6" Thick

$\frac{1}{2}$ " steel Rod on 8" centers

Steel held mid way by placing on rocks prior to pouring cement

Styrofoam 4" Thick around perim.-4' wide

4 mil. plastic sheet

Compacted Gravel Base

We were now ready to place the re-enforcing steel, and then we found out how much it cost! That was going to blow our budget all to you know where.

Rick Coy solved this one for us. Out back in an old gravel pit were the old screens that had been used years ago on the "crushers". These screens wear out from time to time and have to be replaced. Rick found where they had dumped the old screens, something like the fabled Elephants Graveyard", only this was the remains, not of ivory and bone, but steel, wonderful steel. So off we went to collect it.

A slight problem arose, those old screens had been laying there for about twenty years and we discovered a very important fact. For any of you who have tried to grow trees on your lawn, you know what happens, they usually die. Well, all you have to do is throw down some old crusher screens, nothing else, no seeds, nothing, and trees will grow up through them! What a job: chop, beat, thrash, pull, chop, sweat, and swat. Eventually we beat out enough for a load to take to the site.

Once there, the screens, which are made of  $\frac{3}{8}$  and  $\frac{1}{2}$  inch steel rod woven into anywhere from one inch to four inch squares were beaten apart with sledge hammers and the rods piled up.

As we were building on a slab of re-enforced concrete, all the domestic drain pipes had to be put in place first. The water supply would go overhead. Only the drains are under the slab.

We had thought of mixing the concrete and pouring the slab ourselves, but when you figure that the total floor area was just under 3000 square feet and the slab was to be 6 inches thick, that's a lot of mixing and lugging. I also wanted it to be "uniform" throughout and that meant that the whole thing had to be poured at once. That meant only one way—Ready-Mix.

Because of the size and placement of the steel rods, I felt that 2400 P.S.I. mix would be plenty. Of course, they would rather sell you 3000, it costs more. They also wanted to charge me extra because of the distance. I was, they claimed, over the 25 mile limit from the plant. We measured it. I found the best route for them to take—it came out to  $24\frac{1}{2}$  miles! (You can't blame us both for trying—but my need was greater than theirs.)

Everything was all set—it was SITUATION GO!

Actually, two pours were planned, one for the lower slab, and one for the upper. It was not too long before the truck of Ready Mix rolled in and the lower slab was in place.

DEPARTMENT OF NATIONAL DEFENCE

# NO TRESPASSING

NATIONAL DEFENCE ACT

1. No person shall, without lawful authority, enter or remain on any premises or in any place to which access is prohibited by or under this Act.

BY ORDER OF THE  
DEPUTY MINISTER  
OF  
NATIONAL DEFENCE

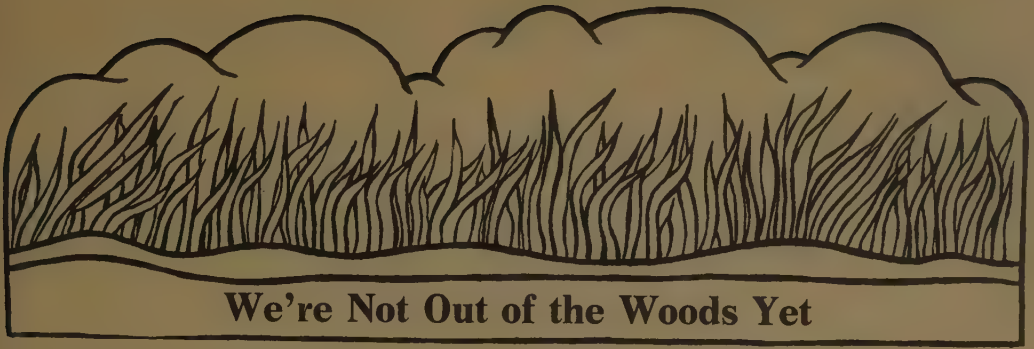
Ministère de la Défense nationale

# DÉFENSE DE PASSER

LOI SUR LA DÉFENSE NATIONALE

1. Toute personne qui, sans autorisation légale, pénètre ou demeure sur un terrain ou dans un lieu dont l'accès est interdit par la présente loi, est coupable d'une infraction.

Par ordre du  
SOUS-MINISTRE  
DE LA  
DÉFENSE NATIONALE



## We're Not Out of the Woods Yet

Suddenly, there was a phone call from the Log Trucker, Mr. Sullivan. He could get our logs out the next day — Whoopee! We are back on schedule. The upper slab can wait. Hold everything. Round up the gang. At last we are going to get the logs home.

As I mentioned before, we cut our logs in the Camp Gagetown area. This is a huge Canadian Armed Forces base, 425 square miles of training ground, and our little village is right on the edge of it.

Sure enough, next morning, right on schedule, two huge tractor trailers roll in and away we all go to get the logs.





Another problem, (they seem to keep cropping up, don't they?) The Army had decided to close off the area because of some artillery training that was scheduled to take place later in the day. What a BUMMER! I phoned the Range Officer, but no amount of pleading on my part would do, it was closed and that was it. We only had to go 200 feet inside the gate to get the logs—so damn close and yet so damn far.

The thing that really "frosted my ass" was the fact that because the woods were so dry, the Army had cancelled all Artillery practice that day due to the danger of starting forest fires! It seems that the guy at the gate had not got the signal, or had not read it.

Summer was almost gone. I had hoped to have the walls up before the end of September, and now we were going to have to wait another two months. That was **out**! We had to think of something else and damn fast.

The drivers of the trucks informed me that they were scheduled to haul logs in another part of the province and couldn't get back for at least two months! It looked like "Ballgame over", and after all the sweat, blisters, black flies, and gallons of fly dope. It was a very discouraging day.

"—modern warfare destroys what it claims to foster. The day is gone when men sent life coursing through the veins of a race by the sacrifice of a little blood. War carried on by gas and bombing is no longer war, it is a kind of bloody surgery. Each side settles down behind a concrete wall and finds nothing better to do than to send forth, night after night, squadrons of planes to bomb the guts out of the other side, blow up its factories, paralyse its production and abolish its trade. Such a war is won by him who rots last—but in the end both rot together."

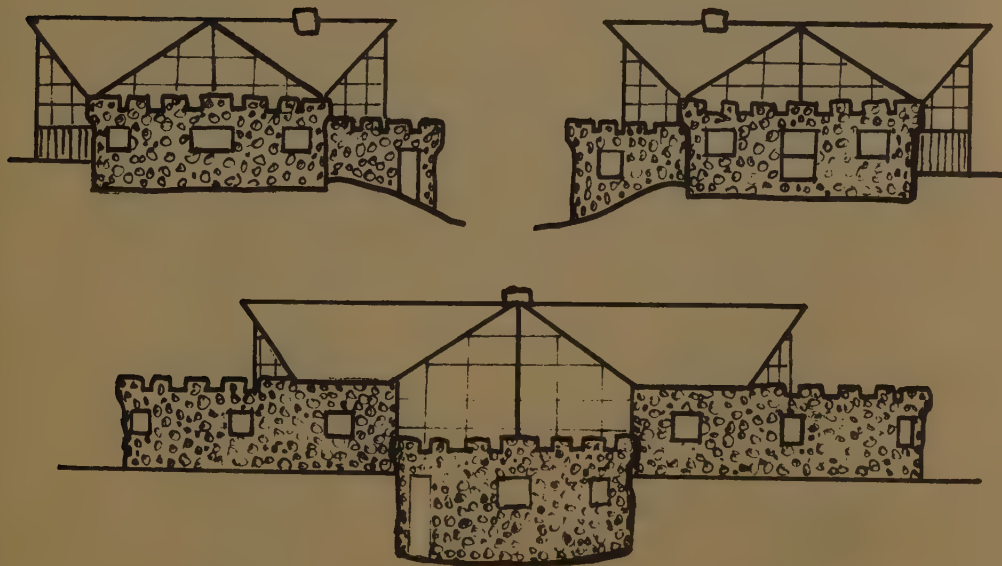


Let's take stock. What do we have going for us? A "farout" design, a huge pile of logs, a site, the drains installed, the slab poured and a lot of empty fly dope bottles. So, let's go with that, only let's get the logs out. Let's cut them to fit the truck if we can't get the truck to fit the logs.

It was then that we decided to use only the "Cordwood Wall", with the round corners. All it required -was to modify the ends of the slab to comply.

### **The total Cordwood Concept**

Because I'd designed the roof to go with the horizontal log type construction, I didn't feel it looked the same on the cordwood wall. The wood blocks had the appearance of stone, so I felt that I should develop this illusion a little farther and make the house look like Modern Fortress. This meant redesigning the roof (again).



I desperately wanted to keep that bridge across the living room, connecting two little lofts on either side. As you can see by my final selection, (better call it semi final as you will see later) the idea had a lot going for it.

We picked up a couple of sun decks along the way. The “Castled Parapet” edge would really make it look like a fortress. I also was making myself a lot of extra work. I was starting to lose sight of my original objective, ie. keep the house simple. But I was hooked.

One day the model was dropped, and crunch went the fancy roof. I thought, “Hey, maybe someone is trying to tell me something.” So, let’s not just rebuild it—let’s redesign it entirely. It would be fairly complicated to build anyway.

We were starting to run out of time and that meant only one thing. We had to come up with something simple, inexpensive, and strong. We were back on track once more. Let’s see how the pioneers would have done it. They hadn’t let us down so far, so, like the pioneers did, we did. Sod roof on the wings (it’s dirt cheap). And the center section? Well, we will keep the ship, but we will build it upside down. What could be stronger? The main roof is built exactly the same way as you would build the hull of a ship. Turn it over, and you have a “Gambrel” roof. Leave the pointed bow where it is and for the rounded stern, half a Geodesic dome. And there it was.

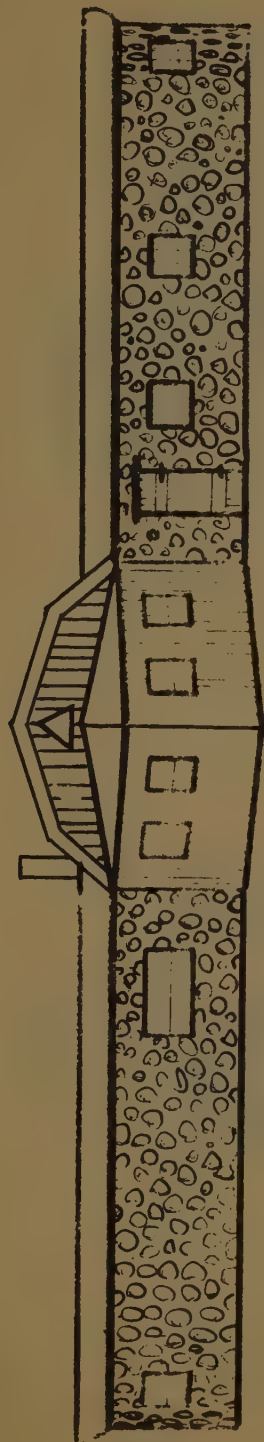
Well, almost.

We cut all the “butt ends” of the logs, (about 20 feet long), and took them to the local mill and had them sawn into 2X4’s, 2X6’s, 2X8’s, 2X10’s, and 1 inch boards. This was where the scale model really helped. We knew exactly what we needed. I had to buy an additional 6000 board feet of lumber (spruce) to complete our needs and we were all set there. In order to keep our costs down, we used the lumber just as it came from the saw, nothing was put through the planer. The balance of the logs, with the exception of about 30 lengths to be used for the walls in the center section, were cut into blocks.

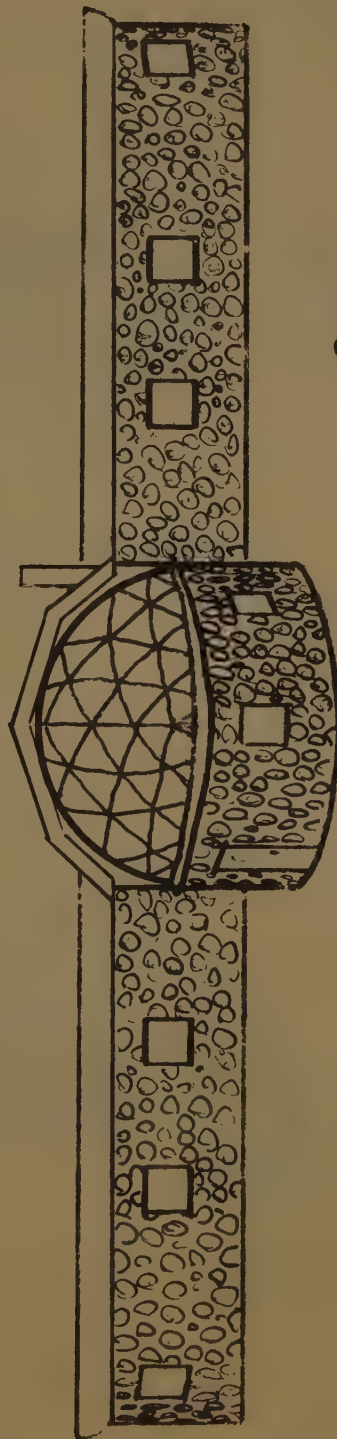
Winter was fast approaching and it did not take too long to realize that we did not have enough blocks to complete the house. I then bought ten cords of fire wood (in four foot lengths). —Elm, Maple, Beechwood, Birch, etc. that had been cut and piled for about two years and was bone dry. (I also realized we didn’t have any fire wood, either!)

We started cutting the wood up and thus grading it. If it was “sound” it went into Building Blocks; if it was hollow or not quite up to par, it went into fire wood. The fun part was pounding the bark off the building blocks. (But it makes great stuff to start a fire with!)

In the meantime we got the upper or main slab poured and the actual construction of the house began.

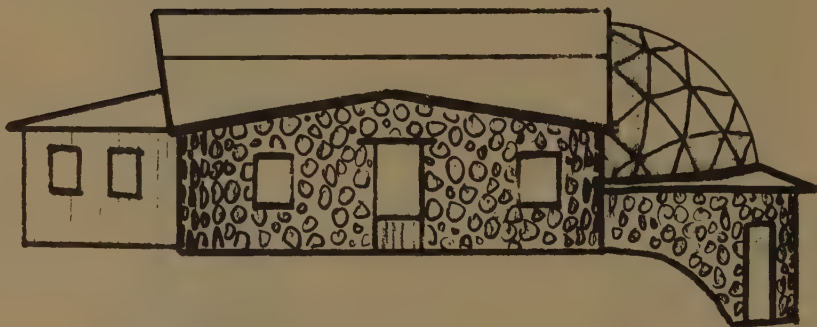


Front



Rear

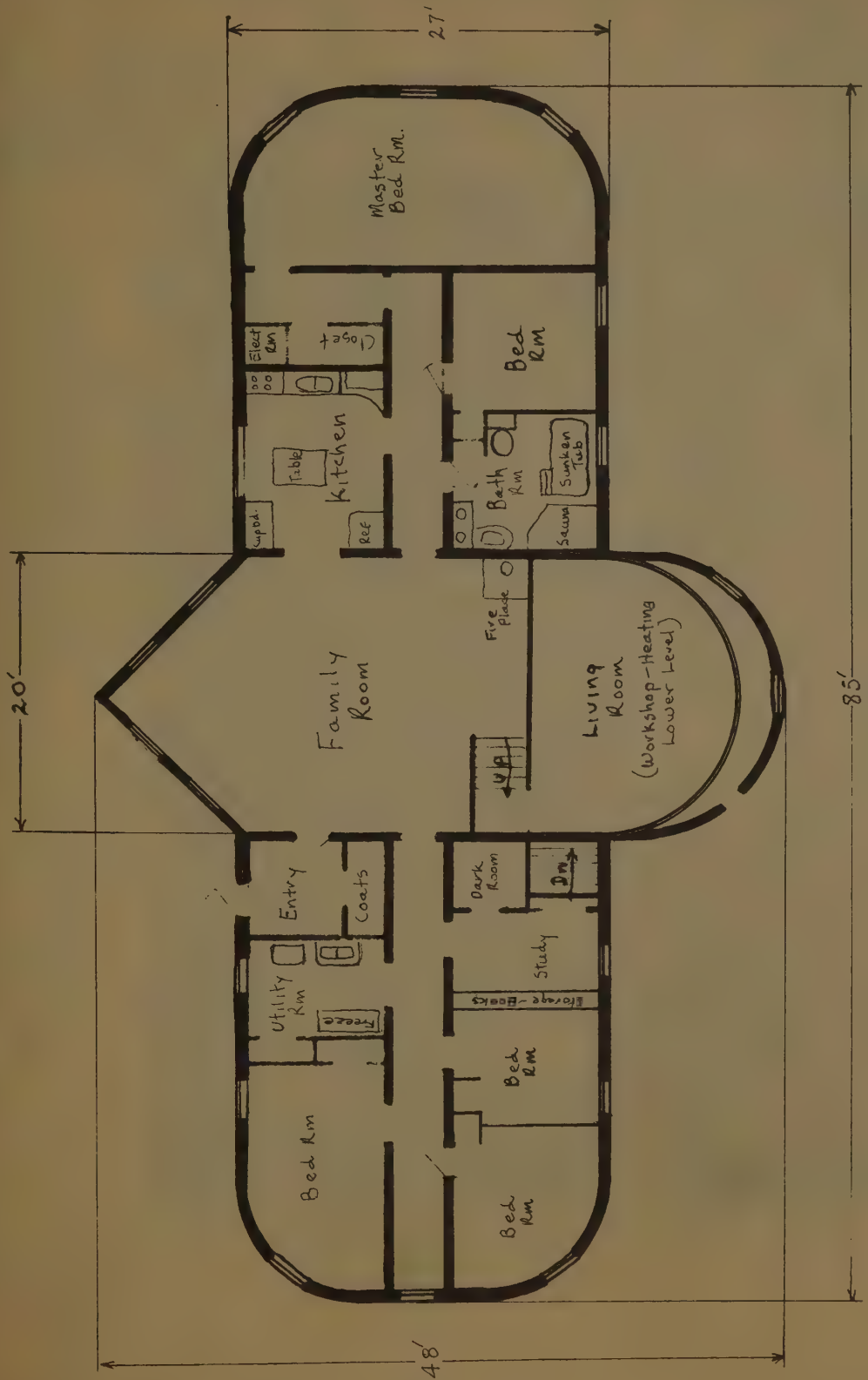




East



West

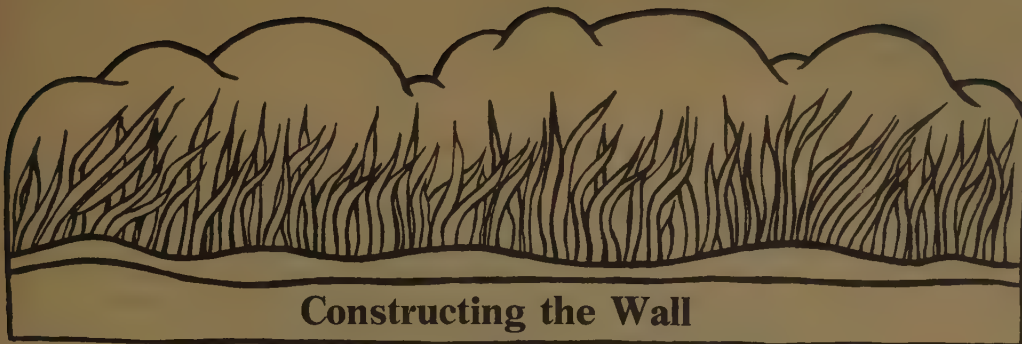


Floor Plan

Scale  
10'



"—and now here is my secret, a very simple secret: It is only with the heart that one can see clearly; what is essential is invisible to the eye."



## Constructing the Wall

### Material A Wood Blocks

Again let's look back and see how the ancients did the job. Their first job was clearing the land. Simple—set fire to it and then clean off the debris. Sometimes this method got a little out of hand and more land got “cleared” than they wanted, but what the hell, there was a lot of land back then.

So they cleared what they needed or could use right then. The timber that wasn't consumed in the first fire was left standing or lying as the case may be. This was cut up and stacked to dry for fire wood and building blocks.

So here is your best and cheapest source of material, fire killed wood—and as a bonus to the environment you will be removing the dead trees so that new growth can establish itself much faster.

In this particular area there is a great deal of dead Elm—this is great. Although Elm has a funny smell when first cut, once it is dry there is no smell at all. Any dead tree that is left standing may be used. How do you know if it is alright to use? If the wood is solid when you cut into it, there is no problem.

**Before using the blocks in the wall** be sure there is not any bark left on them.

An indication of the necessity of doing this, can be shown by using the town of Saint Quenton, New Brunswick as an example. In the early 20's the community was burned down and later rebuilt using the burned trees. The first houses built used relatively “green” wood with the bark still on it. Those houses did not last. The homes built later (approximately 3 to 4 years), after the wood had dried, shrunk, and the bark had fallen off are still standing today and as solid as the day they were built. This was probably the last time this method of construction was used on an extensive scale in North America. It is quite difficult to find these houses because for the most part the walls have been covered with clapboard or similar material. You can tell them by the thickness of the walls.

Now that you have made arrangements to clear the area that was burnt out three or four years earlier, you can begin to cut the trees into blocks. The blocks should be about a foot long, or in keeping with the new system, 30.48 cm. I am suggesting “one foot” because I think that it would be easier to work with a longer block. The blocks in our present exterior wall are only 9”. Of course, a lot depends on the availability of the wood—as far as strength and insulating qualities are concerned, nine inches is plenty! It is not important to be exact, as long as the blocks are fairly uniform in length. Stack them like you would fire wood, and allow them to dry and shrink.

If you can't find fire killed wood or if your trucking charges would be too high and if you have a lot of time, you can cut the wood yourself. If money isn't too scarce, buy “peeled” pulpwood (about \$40.00 a cord in this area, if you can find someone who will do it, as I mentioned before, peeling is a bummer if it is not done as soon as the tree is cut down).

Cut the pulpwood into blocks and pile it to dry. Pile it in the shade and the blocks will not split as much as they would if piled in direct sunlight.

Any type of softwood is excellent, you can even mix them up. Hardwoods can be used too; but remember—hardwood takes at least twice as long to dry out. The more species of trees you use, the more interesting and colorful a wall pattern you will have.



**How do you cut the blocks? Well, there are three methods.**

1) The fastest way is to use an old circular saw, the type used on a farm for cutting fire wood. Paint a mark on the table or something to use as a gauge and slice them (the blocks). Be very careful around this machine, it can cut off a hand or arm some quick! **Do not** try it alone.



2) Attach a gauge to your chainsaw. A problem here is that you can only cut one way; ie. from left to right along the length of the wood. This can be very awkward.



3) Mark the length of wood with a tape measure and crayon before you cut it with the chainsaw. This takes a little longer, but is very simple to do.

**How much wood do you need?** Of course, this depends on how big your house is going to be, but it is very easy to figure out. One cord of wood cut into one foot blocks will give you four sections of an 8 foot high and 4 foot wide wall or 16 feet by 8 feet. Actually, it gives you a bit more because of the space the lime mortar takes up, and, there are also the windows and doors. But, figure the wood measurements for a solid wall. Remember, this is not brick or stone—what you do not use in the wall, you can use in the stove!

**What about interior walls?** These walls are 6 inches thick so you cut your blocks six inches long. Here, one cord of wood will make 32 feet of wall 8 feet high.



#### **Material B Lime Mortar**

Portland Cement was invented in this century and already some of the houses in which it was used are falling down. Find a house built in the 1700's and you will find that they used **Lime Mortar**.

Lime mortar is fantastic stuff in that unlike concrete it is flexible to a certain degree. It also is a poor conductor of heat and moisture. The most important feature of this substance is that it is "self-healing". What takes place is this—if a crack develops in the wall, the lime in the mortar leaches into the crack and calcifies. If it is a large crack you stuff it with a loose lime mortar mix, but more about this later.

**How do you mix it?** One of the main disadvantages of lime mortar is it takes so long to set up. The old timers used just lime and sand with a dash of vinegar and soda to produce carbon dioxide, but this takes ages to harden.

What you are trying to do is copy a process that took billions of years for nature to produce the same effect. Shellfish were born, died, born, died and their shells kept piling up. Time, heat, cold, and pressure ground the shells up and carbon dioxide in the air and water turned the whole thing into limestone.

If you want to, you can make your own lime by gathering up oyster and clam shells, burning them in a fire and pounding them into a powder. This makes a very good lime. This process was used by the Norsemen. Thoreau, the famous American author tells how he did this in one of his books. As I said, it works great, but it's much simpler to go buy a bag of Hydrated lime! It is a lot simpler to go buy a bag of Masonary Cement as you will see in a minute. The main factor is BUCKS! Convenience costs money.

So let's get back to the immediate problem. That is, mixing up the mortar. First thing—buy, beg, borrow or steal a small concrete mixer because mixing by hand with a box, rake and hoe is a back breaking, time consuming method and it is very difficult to get uniform mixes.



We want to speed up the set up time, this means we must add a catalyst to the lime and sand—Portland cement. So now we have all we need; hydrated lime, Portland cement and sand (a good sharp clean sand), and now we are ready to roll.

The cement mixer is turning and we are off and running. First throw 20 quarts of sand into the mixer and next 5 quarts of lime (step back—the lime dust will make you cough like hell), then throw in 3 quarts of Portland cement. This is a good mix for this latitude, the further south you live the more lime you can use and the less Portland cement; ie. 6 lime: 2 cement, or 7 lime: 1 cement. Be sure to keep it 8 of powder to 20 of sand, this gives you a 2½ to 1 mix. The best way and quickest is to use a 5 gallon can for the sand and a 5 quart pail for the lime. I found a sap bucket (for maple syrup) that works great and a three quart plastic pail (small pail used by painters) for the Portland cement.



The other route is Masonary Cement, it gives you the lime and cement pre-mixed, all you need then is the five gallon can and an eight quart pail. However, mixing your own costs quite a bit less.

Now for the mixing. Let the sand and the lime and cement mix dry for at least five minutes in the mixer. This to ensure that each particle of sand is coated with the powder. Now, add the water and not too much. The amount of water depends on how much moisture is in the sand to start with, so I can't tell you exactly how much to use. Above all don't get it too loose. You want the mortar to form a ball that will hold its shape when you "pat" it down. (Like making a snowball.) Now you have the blocks (A) and a batch of wet mortar (B), and it is time to start the construction of the building.

### C—Stands for Construction

The most important piece of equipment you will need is a pair of Rubber Gloves, the kind used for housework, anything else is too bulky. You are going to use a pile of them because the they tear quite easily. If you are right-handed you will end up with a pile of left hand gloves, and vica versa. No sweat, take one of the good lefthand gloves and turn it inside out, now you have a right-hand glove. **Do not work without gloves.** The sand will wear off your finger tips (great if you are a part time safe-cracker) and the lime will burn hell out of your skin.

The next most important tool is a plumb level or spirit level, a long one. This is to keep your wall vertical.

Build horizontally, not vertically; that is, go round and round the house. Do not build higher than two feet at a time, otherwise the wall will twist and slump from the weight before the mortar hardens and you will be in a mess.

Of course, your door frames are all in place and "propped" solid, so let's get cracking.

Start by laying two rows of mortar along the top of your slab or foundation wall. (Where you want the wall to go, of course.) The outside to inside dimension of the wall is one foot. REMEMBER to leave a space in the middle of the wall to provide insulation.

Now lay the wood blocks on the mortar, leaving some space between them. Lay them as you would when piling a "rank" of fire wood.

I am, of course, assuming that you have amassed a pile of scrap styrofoam from the local dump (sorry I didn't mention this before). Break it into chunks and stuff it between the blocks half way through the wall or where there is a space between the two rows of mortar. The old timers just scooped out the space in the mortar, but this styrofoam technique is much easier. This is a "MUST" in your exterior wall. The wood will not transmit heat or cold but the mortar will, so you must have a break in the wall.

Now that you are under way, start mixing another batch in the mixer. You can let it dry mix while you are laying blocks. When you see that you have about ten minutes of mortar left in your pail, add the water to your dry mix in the mixer. This way, when the mortar you are putting in the wall runs out, you have another load in the mixer waiting, no lost time waiting for another load.

For the next row, just wad the mortar again in two rows along the top of the first row of blocks, mix the blocks up size-wise, avoid a bunch of blocks all the same size, if it looks too uniform, you may have to split the blocks in half, in thirds, or in quarters, anything to break up the uniform pattern. Put your styrofoam between these blocks and repeat the process.

O.K., let's get building, the mortar is getting hard!



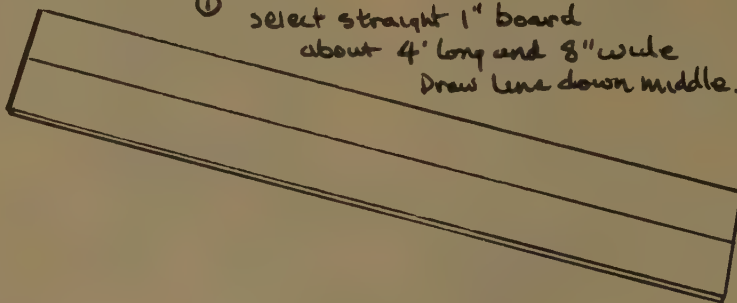


As the wall builds up smooth out the mortar between the wood blocks or even rout it out with your fingers so the ends of the blocks actually stick out a little. (Looks real nice.) Do not worry about getting it smooth or even, it can be done, but if you want smooth walls, this is not the method to use. The idea is a rough rugged wall and that is what you are going to get.

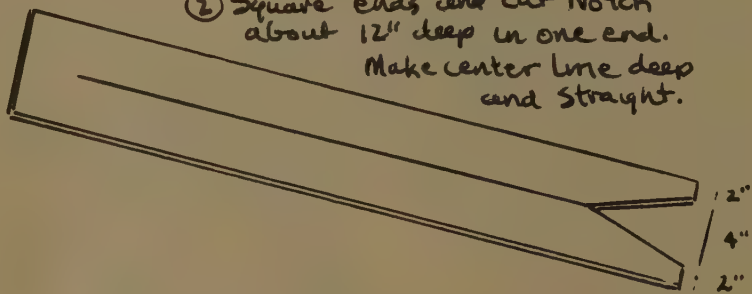


# How to make a "Plumb level" for vertical surfaces

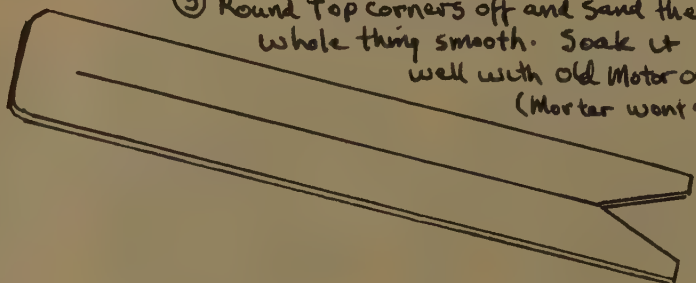
- ① select straight 1" board  
about 4' long and 8" wide  
Draw line down middle.



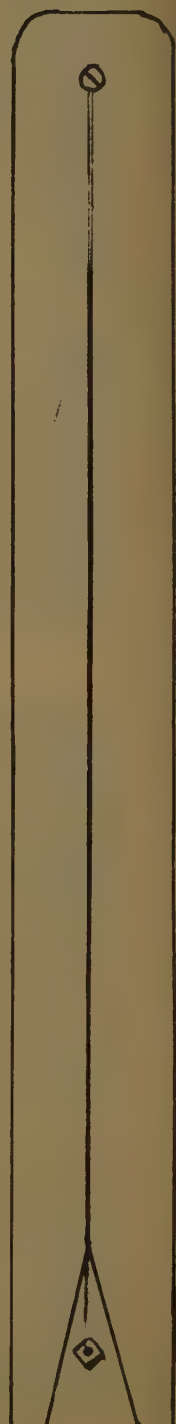
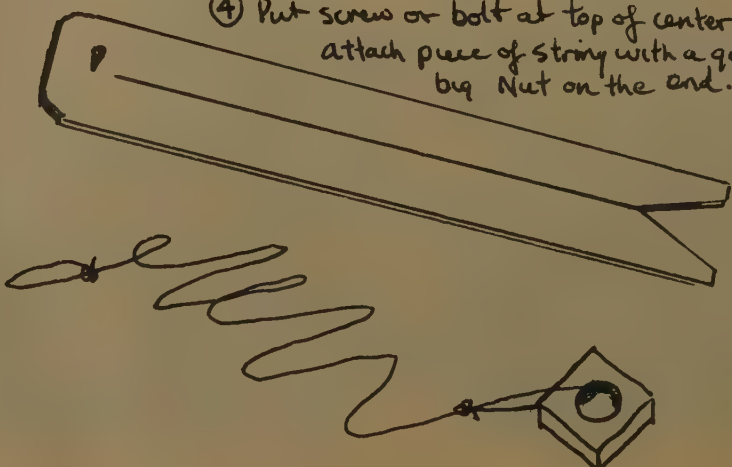
- ② Square ends and cut Notch  
about 12" deep in one end.  
Make center line deep  
and straight.



- ③ Round top corners off and sand the  
whole thing smooth. Soak it  
well with Old Motor oil  
(Mortar wont stick)



- ④ Put screw or bolt at top of center line.  
attach piece of string with a good  
big Nut on the end.



# How to make a "Plumb level" for Horizontal and Sloped Surfaces

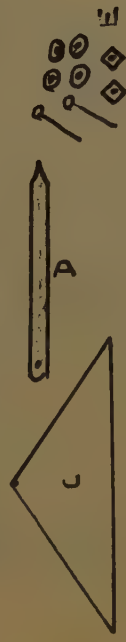


A



B

B



C



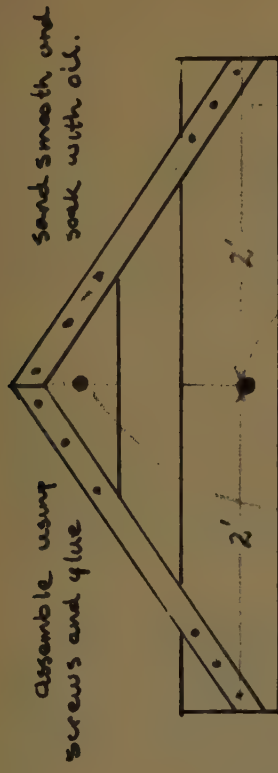
D



B

B

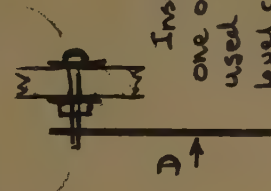
- A - Straight 1" board 4' x 8"
- B - 4 pieces hardwood  $\frac{1}{2}$ " x 1" x 2  $\frac{1}{2}$ '
- C - Triangle from 1" board, 11" x 11" x 17"
- D - 10" Flat Metal Pointer
- E - Nuts Bolts washers



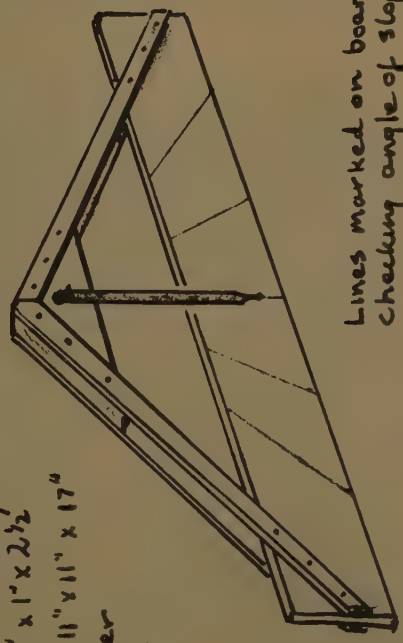
Assemble using screws and glue

Sand smooth and soak with oil.

using a Square mark a line across board and Triangle. Drill holes for bolts



Install bolts, one in - one out. Level can be used upside down to level ceiling Joists from underneath. Just hang Pointer from bolt on 8" board and let it point at line on Triangle.



Lines marked on board for use in checking angle of slope etc.



As the wall progresses, keep checking it with your level to be sure it is going vertically (very important). Now is the time to tap it in or out, after the mortar hardens it is too late.

Pretty soon you will need benches to reach your work from the floor. A couple of saw horses and two 2 x 8 planks work great. Again remember—build horizontally not vertically—it is a great temptation to fill up between the door and the window just to see how it is going to look, but when you get back the next morning and find the wall has slumped out or in about three or four inches at the top! Well, it is pretty discouraging. Give the mortar a chance to set up.

Now we come to the big job, the top of the wall and the ceiling.

As you do not have an exact way of governing the height of the wall, you must build your ceiling joists and/or roof rafters now, and place the whole thing on a scaffold and level it. The 2 x 6 or 2 x 8 or 2 x 10 beams (depending on the spacing and load factors) will become an intricate part of your wall. That is, you build them right into the wall. Do not build your wall above the top of your beams, wait until you board in your roof and then fit and fill it in. There it is, simple as A B C.



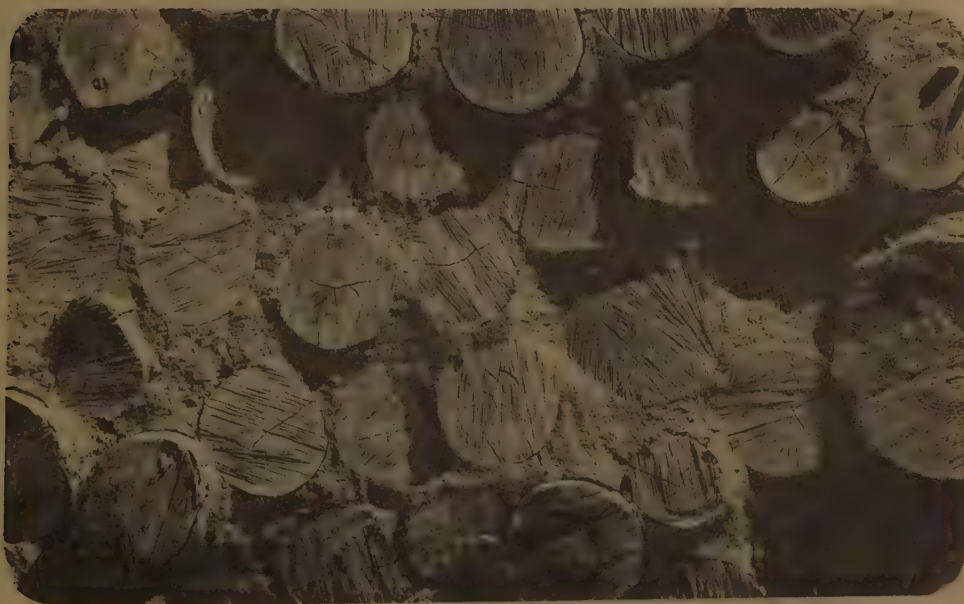
This wall has a hell of a lot going for it. It is sound proof, virtually fire proof, and it's finished inside and out. It is warm in the winter and cool in the summer. It is quiet, easy, and satisfying work. Apart from wheeling the mortar from the mixer to where you are building there is no heavy work, the blocks hardly weigh anything—a child could lift them.

The two things about laying up the mortar that you have to watch are temperature and humidity. The mortar will freeze and if this happens, it will crumble. Do not build in freezing weather unless you can protect the wall. We built part of our house in the winter under a greenhouse like structure, covered with plastic film and heated. Hardly worth the effort and cost. If the weather is hot and dry, the mortar will dry out before it cures and again, it will crumble. So keep things moist. If it is hot and dry throw a wet blanket over your work. (No, not your old maid aunt, a real wet blanket.) Leave the blankets on overnight, and soak them well, you won't hurt the wall. You want the mortar to "cure", not dry out. There is a big difference between the two.

How do you preserve the wood so it won't rot? Don't do anything. Let the wood breathe and thus dry out. The lime in the mortar will discourage any vermine. Insects go into the wood through the sides, not the ends (the growth rings prevent this). There is nothing wrong with soaking the blocks in a preservative. It certainly won't do them any harm.

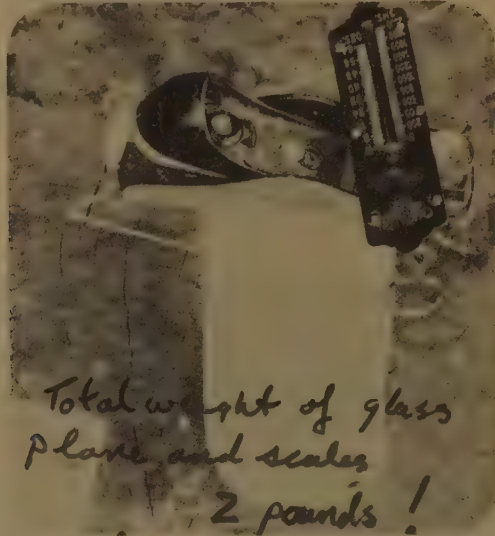
The main thing is to be sure the wood does not touch the ground, or it will rot. Something in the soil will slowly dissolve the wood. Look at wooden telephone poles (untreated), or fenceposts, they rot off at the surface of the ground. So keep the wood clear of the ground.

The only time you put anything over the ends of the wood is if the wall develops a lot of hairline cracks, or if you want to change the appearance. What you put on the wall is an old fashioned Whitewash. The wood can breathe through it, and the lime will fill calcify in the cracks.



### Round Corners

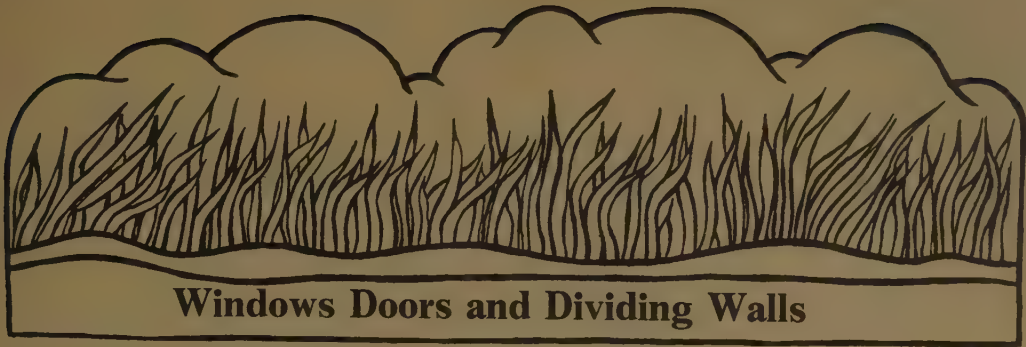
Who needs square corners? Avoid them like the plague, they are evil—the Boogie Man can catch you there and besides that, they are very difficult to build using this method. Also, by curving the wall you develop lateral strength. To illustrate what I mean—take a piece of writing paper and glue the top to the bottom making a cylinder. Stand it on one open end and put a plate on top, now start piling stuff on the plate. You will be amazed at how much it will hold. The same applies to a wall—curve it and you strengthen it.



If you must have square corners go to Post and Beam Construction. (Joe Post and Harry Beam, they have a couple of contracts out back of town in the new subdivision.) What I mean is that you put up cornerposts and frame it with beams and then fill in between them with the blocks. This is more expensive to do but if you must stick with "tradition", go ahead. I prefer to go back to the old ways and keep the corners round.







### General

Our prime aim in this whole project was keeping costs to a bare minimum—and this means one thing—SCROUNGE!

The thing that really amazes me is the amount of perfectly good material that people throw away for the only reason that it is “Out of style”.

One of your first places to visit is the local Dump! The next place is the Demolition and Renovation Contractors. This way you can intercept a lot of material before it goes to the dump. The next stop is—build it yourself. If all else fails then buy it from your local building Supply Dealer.

**Windows**—We got all our windows from an old building in Fredericton—the old Chestnut Canoe Factory. That Company had moved to an “Industrial Park” and the old building was being renovated into an Office Complex, with very modern, thermophane windows. Those beautiful old windows had to go!

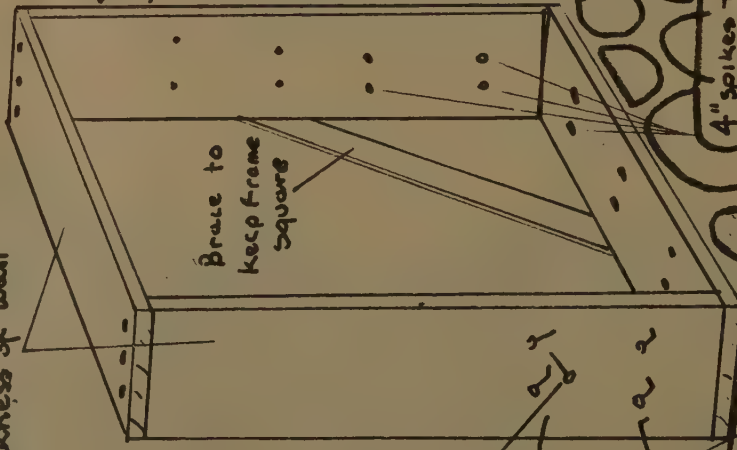
Rick Coy and I picked out 60 of the best windows we could find. The big problem was that the Contractors had cleaned the exterior brick on the old building by sand blasting—and so a lot of the glass was “Frosted” around the edges, but the wood was basically sound.

By the time we got them home, they cost about a dollar each. They were all the same size, with 6-10” x 14” panes of glass. The cost of replacing each pane was \$1.05—so we decided we could live with frosted edges for awhile. We had more than enough to put double windows all around. (The balance will be used for making cold frames for the garden.)





2 x 10 or 12 - depending on  
thickness of wall



Window fitted  
tight into frame

# WINDOW FRAME DETAIL

The side or vertical pieces are cut  
on a slight angle in order that the  
top and bottom pieces slope towards  
the outside. The frame is braced  
to keep it in place and vertical.

Nails to tie frame  
into mortar

Wood Blocks

Styrofoam  
chunks

Mortar

4" spikes to  
wood blocks

Brace to  
keep frame  
square

So now to install them—The Construction of the window frame is very simple. Nail up a box using 2" x 8" lumber so that the windows will just fit inside (see diagram).

Because you are building your walls horizontally instead of vertically, when you get the wall almost up to the level of the bottom of your window just prop the frame up in place and build the wall around it.

In order to secure the frame in place—drive 4" spikes into the blocks of wood that touch the frame. Where the mortar touches the frame—hammer in a bunch of 3" nails, leaving 1½ to 2 inches of nail sticking out. It is going to be a long time before those frames fall out!

As you can see in the sketch—the window is designed so that the "Double window" goes on the inside. This gives you a nice shelf for flowers, knick-knacks etc. etc. If you wish, you can hinge the outer or main window at the top and just prop it open for ventilation.

I prefer to leave it closed—and for ventilation—all you have to do is hollow out one of the blocks in the wall near the ceiling and one near the floor, and fit a piece of insect screening in them in the summer and a wooden plug in the winter. However, because of the insulating qualities of the wall, you will find that the house is cool in summer and warm in the winter. If you want fresh air—just open the doors!

## Doors

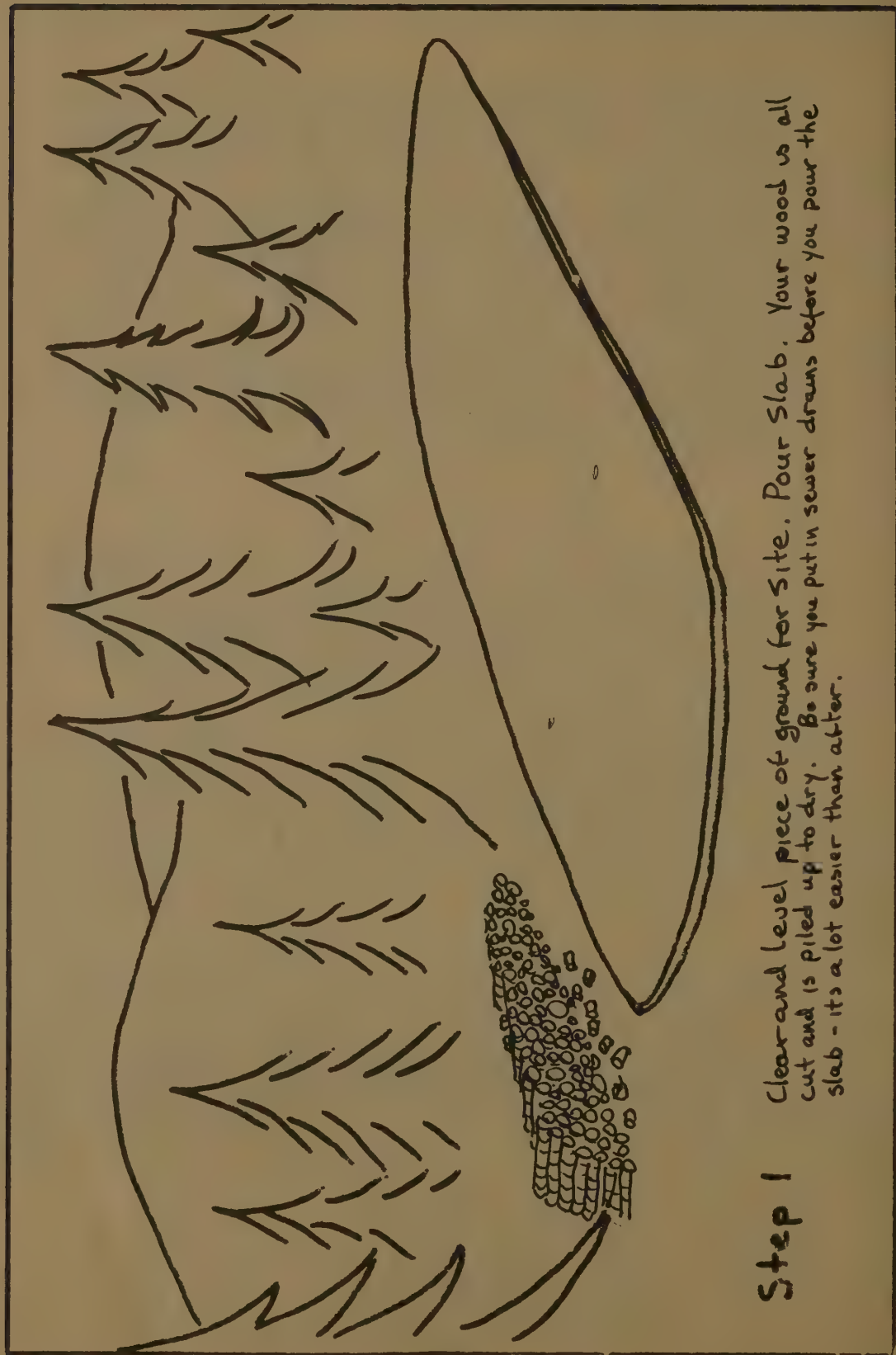
Here we learned the hard way—I thought that the 2 x 8 frame idea, would work the same way for the doors, as for the windows—but a slight problem arose—2 inches is just not thick enough. The damn frame, because it is 6'6" long (or tall—depending on whether you measure it laying down or standing up) has a tendency to warp or bow in the middle, so you have a situation that looks like a knock kneed girl in a mini-skirt. The worst thing about it is that the more you "plain" it, the more it bows in. We have "corrected" the problem, but I'm not too happy with it.

What I would suggest (and what I think I'll do eventually) is use a couple of real heavy timbers for the sides, 8 or 10 inches thick and the width depending on the thickness of the wall.

I know this sounds massive, but you should see my front door. It is heavy and hanging it on a 2" thick plank is a little much. The back doors, which are standard doors are no problem now, but even there I think I should have used at least 4" thick timbers for the sides. You can tie it to the blocks in the wall the same way as you do the window frames—just use longer spikes or if necessary drill into the frame far enough to allow the spikes to have a good hold into the wood blocks. The same thing applies with the 3" nails and the mortar as per the window frames.

**Partition Walls**—No problem here—just standard 2 x 4 construction and finished with either barnboards, gyprock, plywood or whatever turns you on.

There really isn't any need to build it the same as your main walls unless you want the effect. There is however one rather interesting partition or division wall you can construct. Build the wall using a very green wood that shrinks a great deal on drying (Poplar is a real good one, and is quite straight, with no knots.) Once the wood dries you will be able to pop it out of the wall leaving the hard mortar web. It makes a really attractive divider and is quite strong.

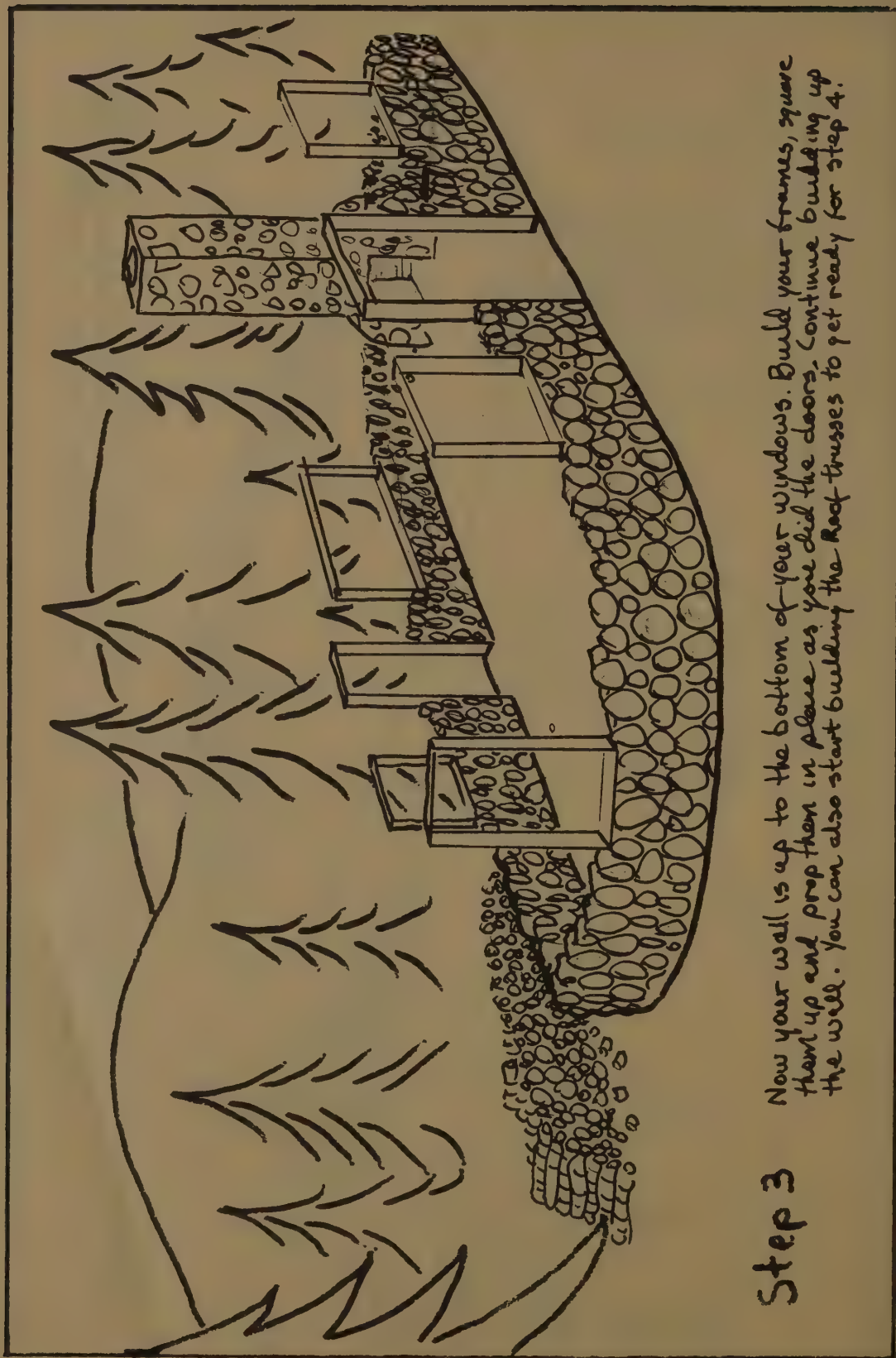


**Step 1** Clear and level piece of ground for site. Pour Slab. Your wood is all cut and is piled up to dry. Be sure you put in sewer drains before you pour the slab - it's a lot easier than after.



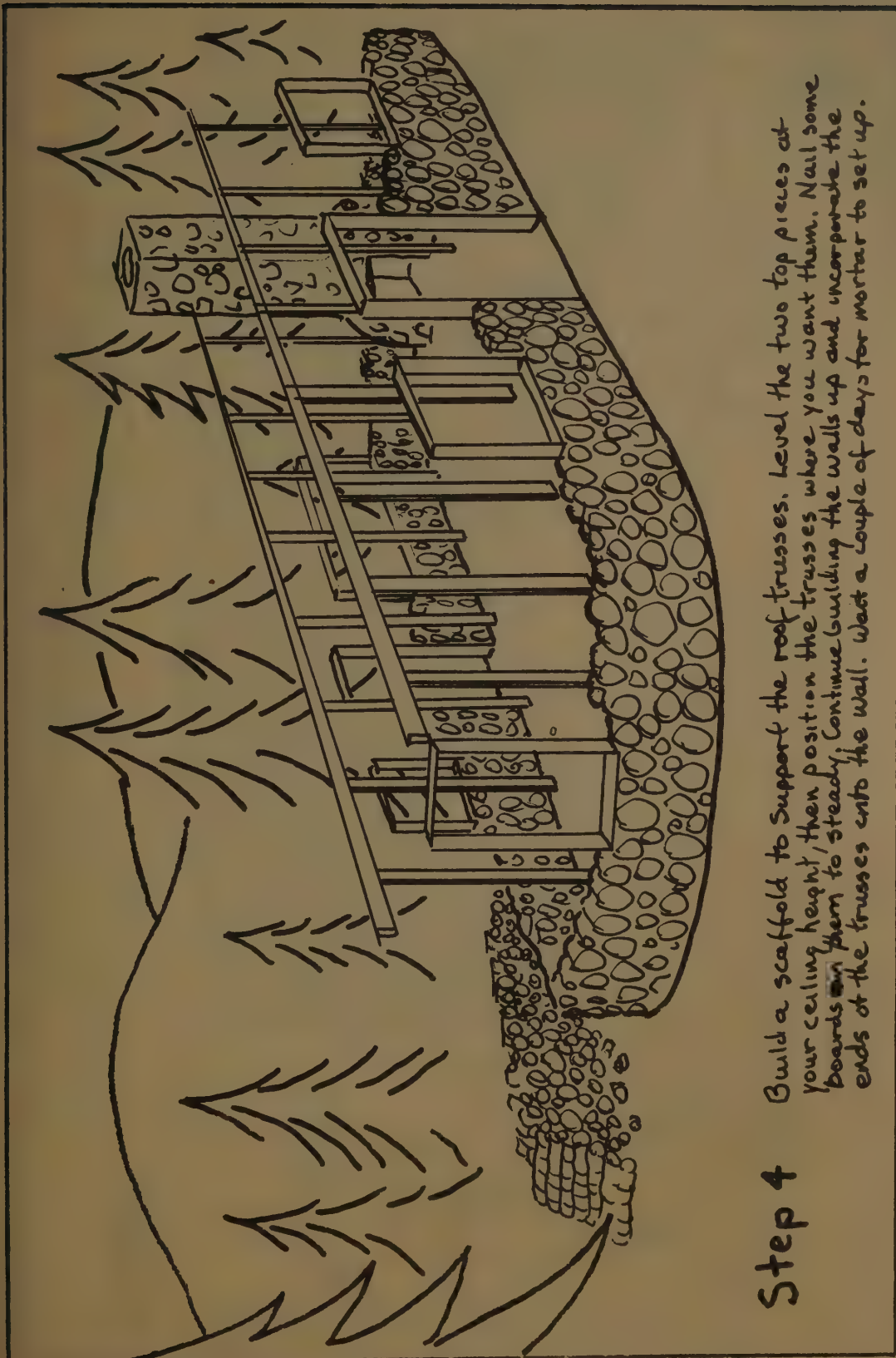
**Step 2** Prop your door frames in place. Build your fire place. Now you are Ready to start laying Block. 3 people is the best number-if you have a cement mixer - One person mixes the mortar and two to lay Blocks.





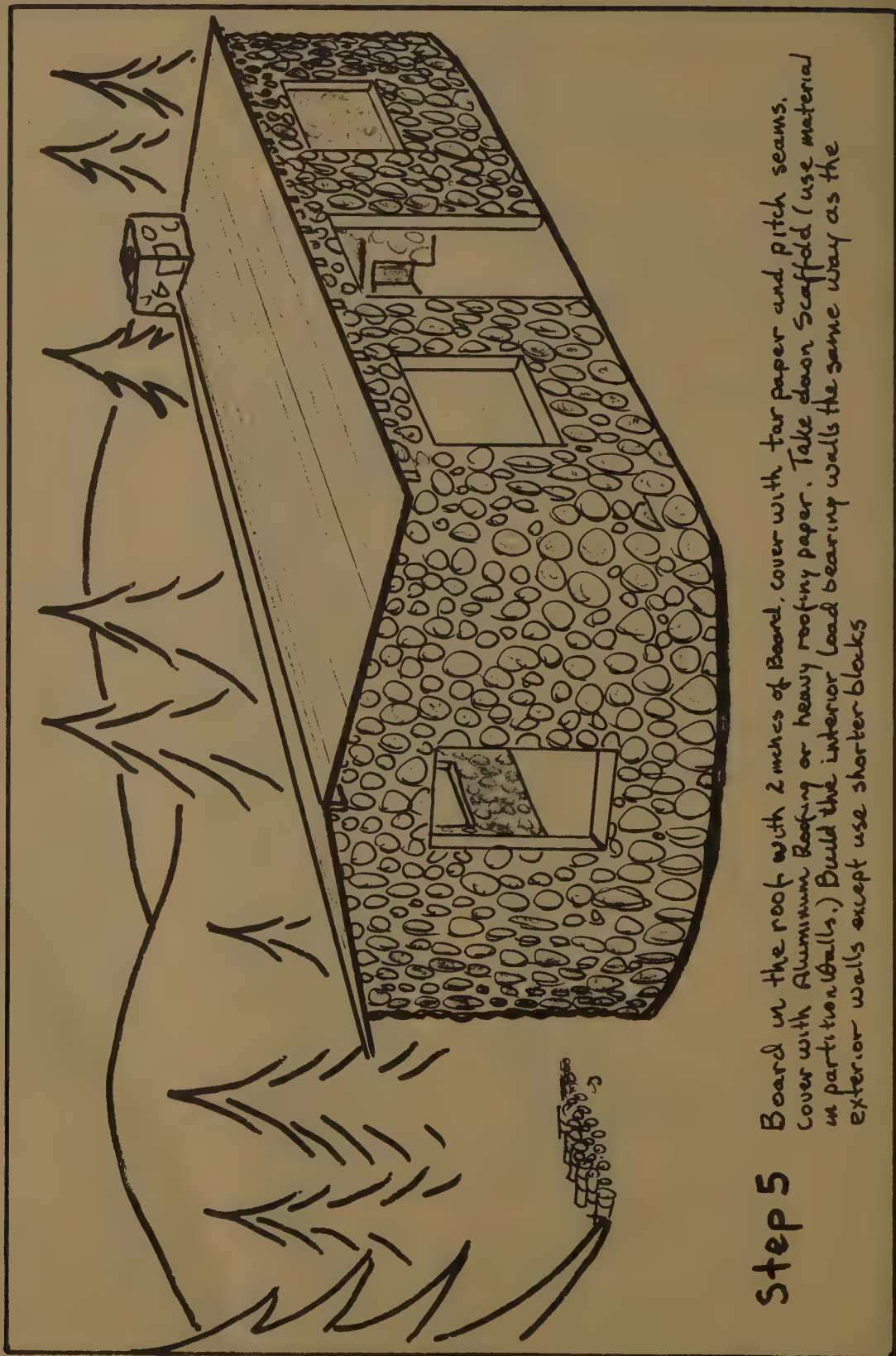
### Step 3

Now your wall is up to the bottom of your windows. Build your frames, square them up and prop them in place as you did the doors. Continue building up the wall. You can also start building the Roof trusses to get ready for step 4.



## Step 4

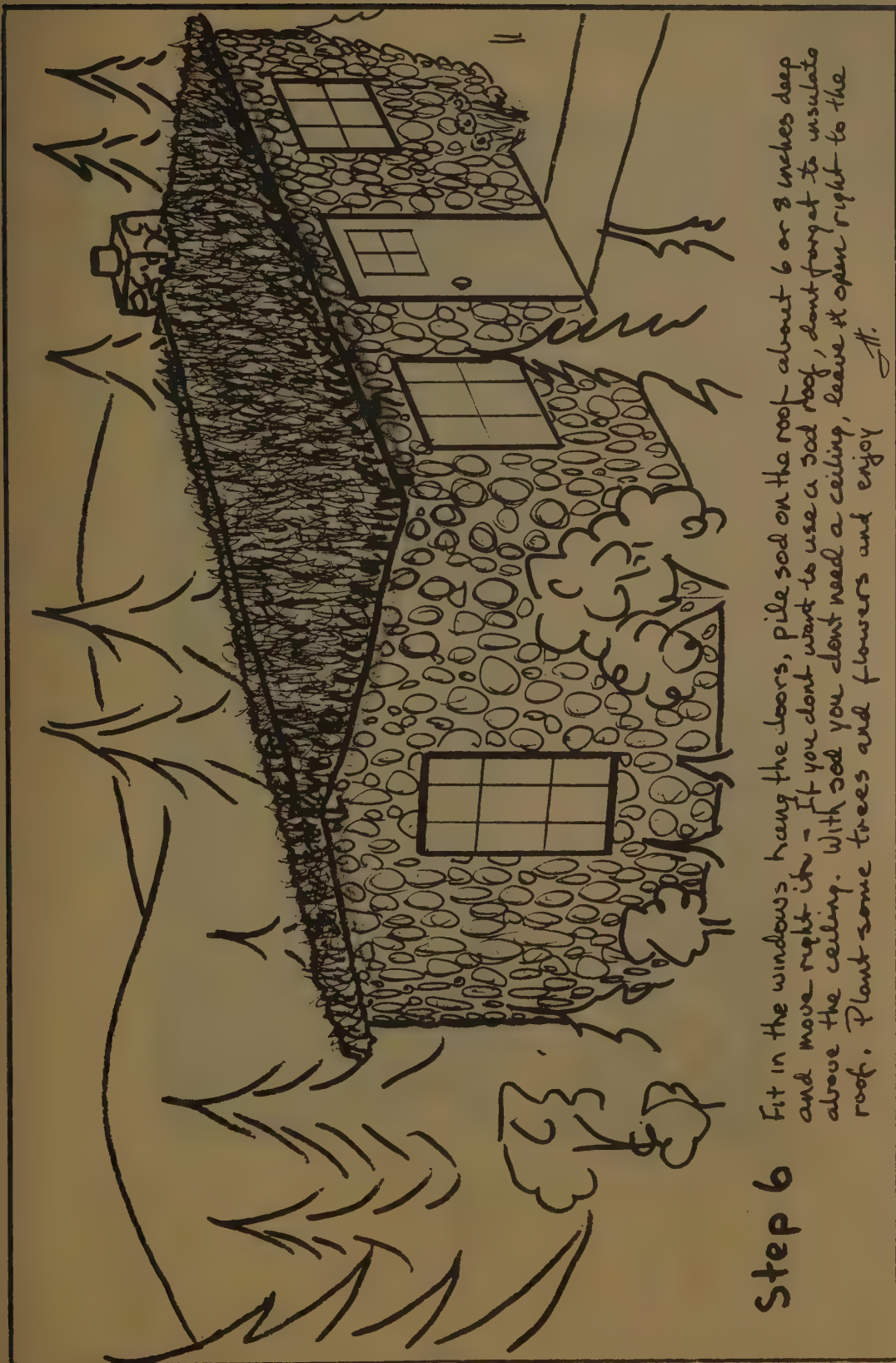
Build a scaffold to support the roof trusses. Level the two top pieces at your ceiling height, then position the trusses where you want them. Nail some boards ~~on~~ them to steady. Continue building the walls up and incorporate the ends of the trusses into the wall. Wait a couple of days for mortar to set up.



## Step 5

Board in the roof with 2 inches of Board, cover with tar paper and pitch seams, cover with Aluminum Roofing or heavy roofing paper. Take down Scaffold (use material in partition walls.) Build the interior load bearing walls the same way as the exterior walls except use shorter blocks





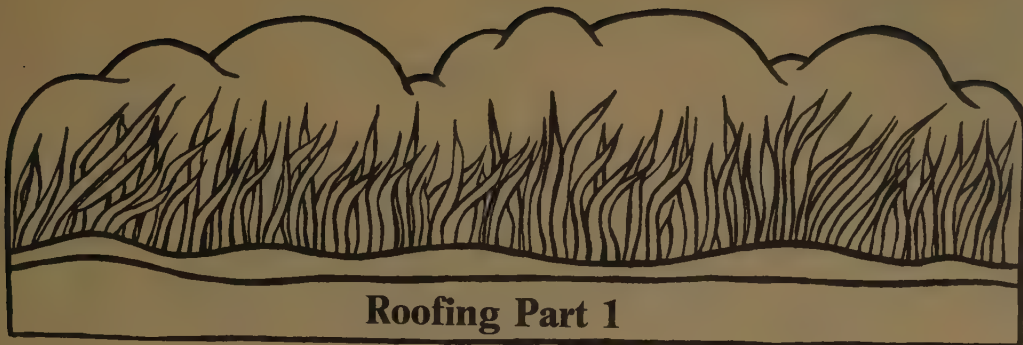
## Step 6

Fit in the windows, hang the doors, pile sod on the roof—about 6 or 8 inches deep and move right in! — If you don't want to use a sod roof, don't forget to insulate above the ceiling. With sod you don't need a ceiling, leave it open right to the roof. Plant some trees and flowers and enjoy.

TH.







“Back to the old Sod.”

A living, or sod roof has a lot going for it besides the fact that it is dirt cheap.

A) Once the growth has established, it is beautiful

B) it makes fantastic insulation

C) it doesn't leak

It has one main disadvantage — It weighs TONS. This is where the “Cordwood” wall comes in. The wall is extremely strong in compression. You are not going to hold up a Sod Roof with any 2 x 4's on 2 foot center type walls or rafters.

In this part of the country you have to not only build it strong enough to support the weight of the sod — you have to add on the snow load factor (about 50 lbs per square foot!) Therefore the Cordwood wall is the best route to take.

The “rafters” are built like a “Box Spar” in an aircraft wing and are placed on 16 inch centers. They are actually a combination Rafter and ceiling joist, made from 2 x 6 spruce and faced vertically. Fantastically strong!

In this design, the long corridor walls are “cordwood” but the blocks are only cut 6” long. In effect you have 12 inches of solid wall supporting the roof in the middle.

The roofing itself is made up of 2 layers of 1 inch board, covered with aluminum sheeting.

I bought the sheeting at the scrap yard for a buck a sheet, and the sheets were 12 feet long. (Now sheeting this size costs about \$8.50 plus per). This stuff had been salvaged from an old barn that had been torn down.

The sheeting was nailed on and all the seams and holes were colvered with hot pitch. This is done to insure that none of the earth touches the wood. If it does, that means — “Good bye wood.”

The way to get the growth to establish is to then cover your roof with good topsoil about 5 or 6 inches deep and then go back to the gravel pit and get your sod from there.

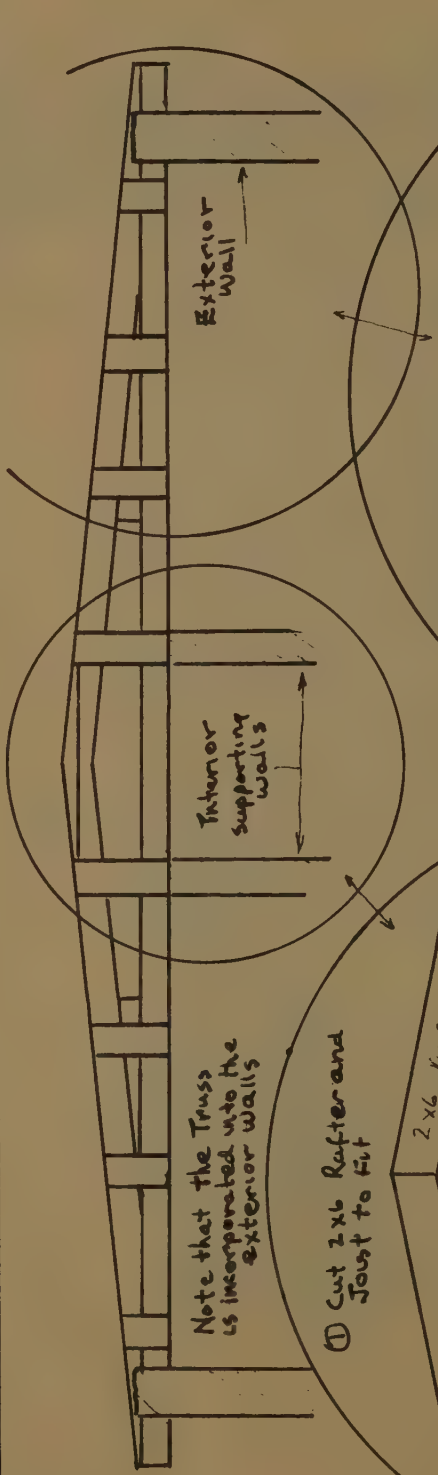
What you want are plants that are used to growing on a low moisture base. You plant 'em on your roof and they just go “ape” — they never had it so good! They can sink their roots into nice fertile top soil...dry but fertile — and they are used to dry anyway

(In areas where it is legal, this would be an ideal place to grow your POT! No strangers could “Rip you off” then! Just keep your pet lion chained up on the roof.)

The reason that it is such good insulation is the fact that the roots of the plants are continually picking up moisture in the soil.

In the winter, the frost line and dew point line are all up in the sod. The fact that the sod is warmed from below, rules out the dangers of winterkill, so come spring — your living roof is back in business again releasing pure oxygen and absorbing carbon dioxide and looking beautiful.

①



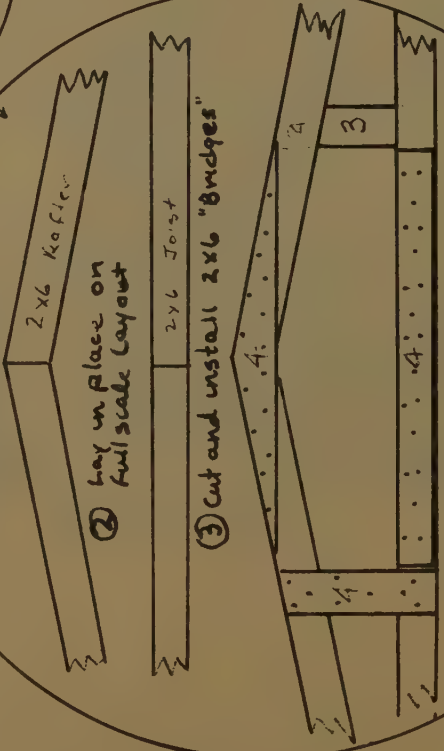
Note that the Truss is incorporated into the exterior walls

① Cut 2x6 Rafter and Joist to fit

② Lay in place on full scale layout

③ Cut and install 2x6 "bridges"

④ Nail 1" gussets in place (on both sides)

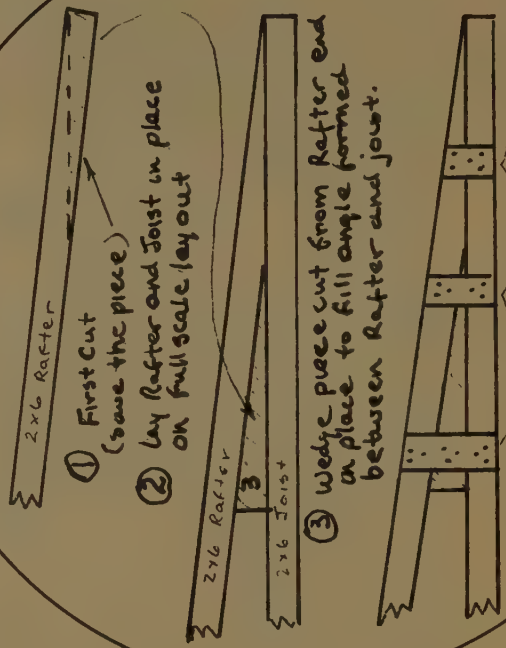


① First Cut (save the piece)

② Lay Rafter and Joist in place on full scale layout

③ Wedge piece cut from Rafter end in place to fill angle formed between Rafter and joist.

④ Nail 1x6 gussets on Both sides



# Construction of "Truss" for Sod Roof

(2)

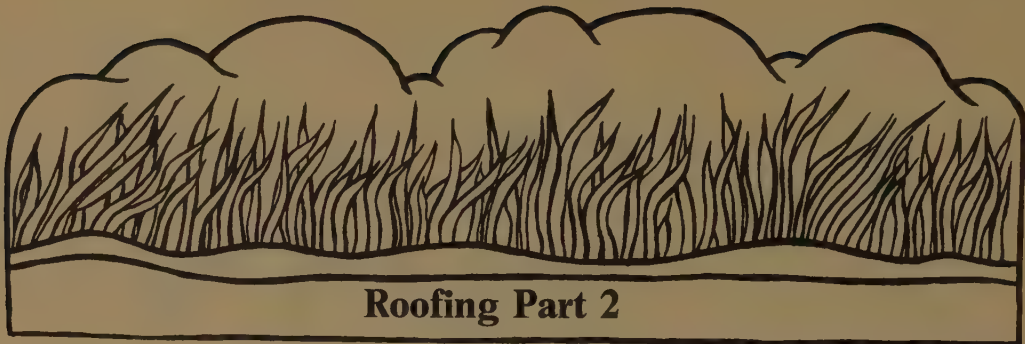


- A - Growing Vegetation
- B - 6 to 8 inches of Soil and Sod
- C - Aluminum Roofing
- D - Tar Paper
- \* E - 2 layers of 1" board
- F - 2x6 Rafter
- G - Bridge and Gusset
- H - 2x6 Joist

Gross Section of  
Sod Roof

\* I used 1" boards (2 layers) because I could buy what I needed for less than 2" plank. Check prices. JF





**We Built it Just for the HULL of it.**

As I mentioned earlier the center of the house was to be a ship turned upside down. The idea was that the hull kept the ship out of the water, it should keep the water out of the ship.

The rafters are built the way the Ribs of a ship are built and are fantastically strong for their weight. The main feature though, is the total lack of clutter from cross beams and braces...just total uninterrupted space.

Well at least that was the idea. Right now my partially completed aircraft is hanging there. The really funny thing though is that it isn't conspicuous!

I've had people come in and then later ask me what ever happened to the plane I was building. The other really funny thing though is the look on people's faces when they realize that what they thought was an airplane, really is an airplane!

The "Ribs" were all assembled on the floor and stacked. Then using the 'old garden hose trick' again, notches were cut in the top logs of the central room and the ribs (or rafters) were set in place. We covered it with 1" boards — and covered that with tar paper. This is how we went through the first winter. I do not exaggerate when I tell you it was not waterproof!

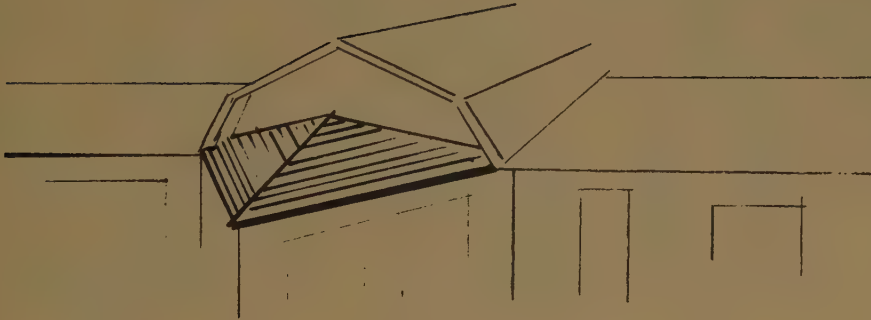
The roof over the "Bow" section is something just a little different (so what else is new?). I had one advantage when I started, in that I didn't know too much about building houses so I was able to tackle everything with an open mind. I don't know if any one ever built roofs like this before but it worked out. The idea is a sort of "Weave" mainly because I had no idea how else to do it.

My problem was that I had to slope the roof 3 ways in order to keep the "illusion" of the bow of a ship. Two triangles would do it but how to built it strong enough so that it wouldn't fall in. Here is how I worked it out.



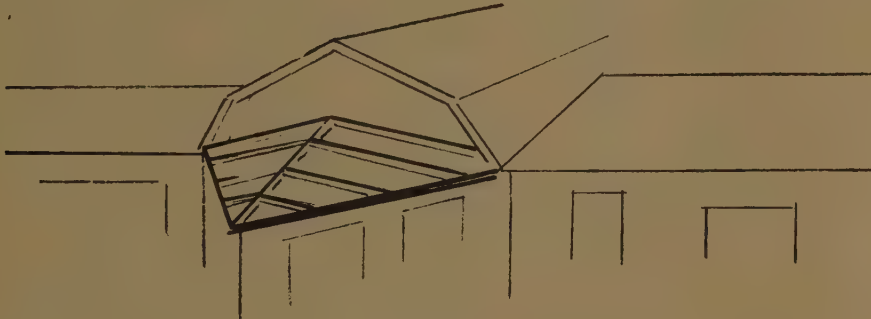
#### **Step # 1**

This shows the way the first 2 x 4 were placed



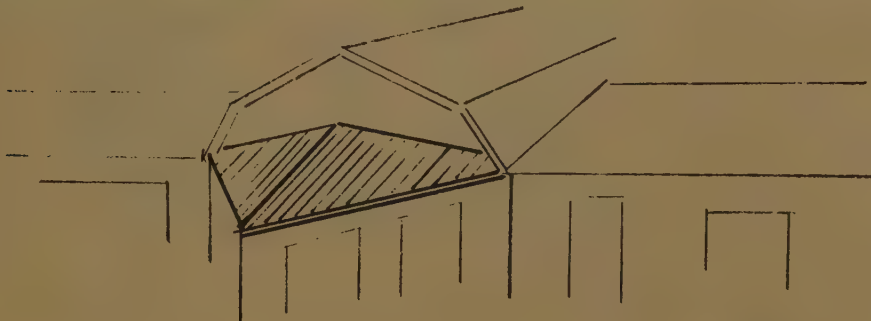
#### Step #2

The 2 x 4's were then covered with 1" boards nailed on 90 degrees to the 2' 4' and covered with tarpaper.



#### Step #3

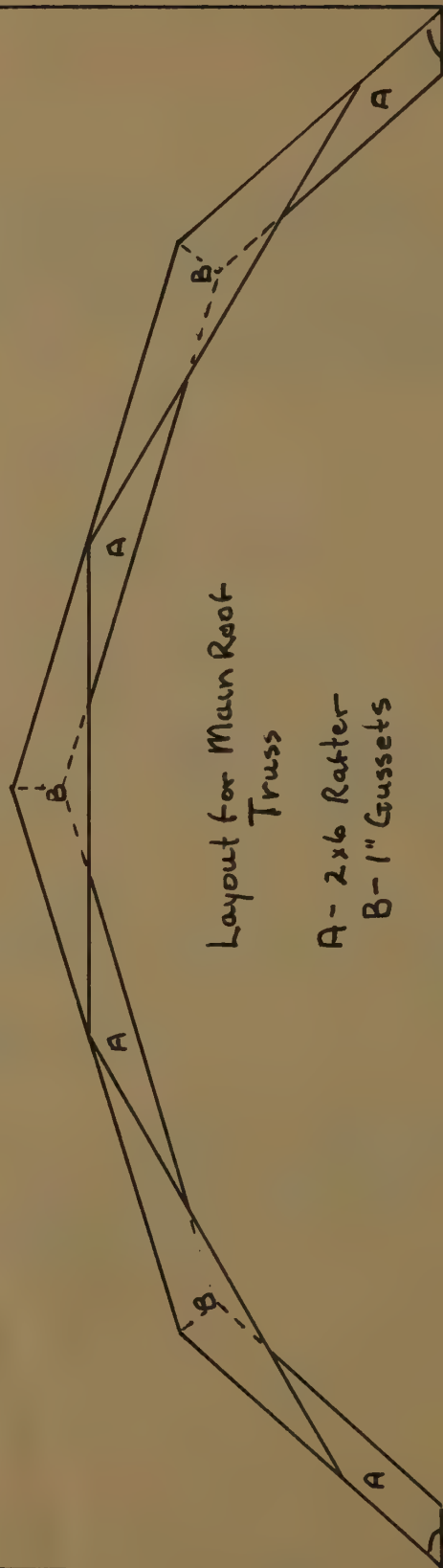
Another layer of 2 x 4's was placed in this direction and 4" of styrofoam placed between them.



#### Step #4

Another layer of 1" boards nailed on, again at 90 degrees to the 2 x 4's, this was then covered with aluminum roofing.

①



Layout for Main Roof  
Truss

A - 2x6 Rafter

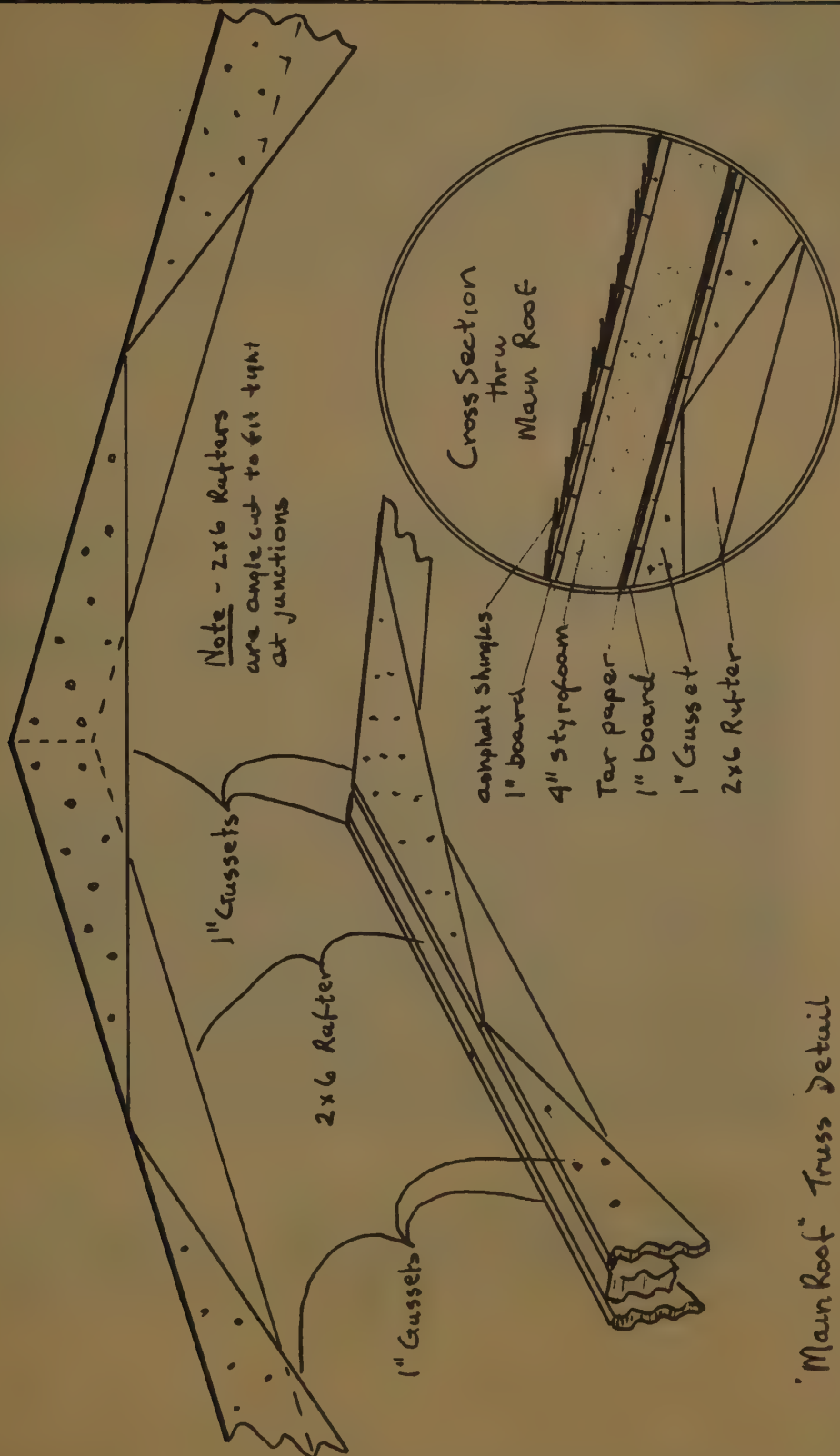
B - 1" Gussets

By using the triangular 1" gussets on either side of the 2x6 rafter at the junctions you have in effect at least a 4x6 laminated rafter or truss

Trusses were placed on 2' centers on top of log wall

Turn drawing upside down - Truss looks like Rib for a Ship's Hull.

2



'Main Roof' Truss Detail



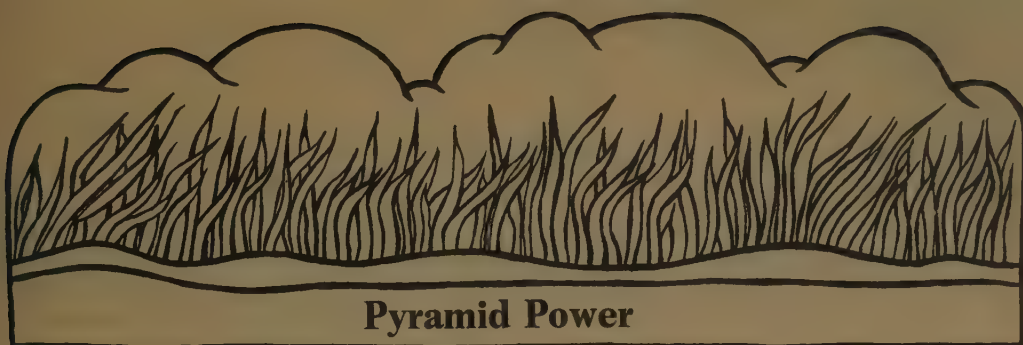
The main roof is insulated in exactly the same way as this one except that on this roof I used full sheets of 4' x 8' x 4" styrofoam. This meant that I put my 2 x 4's every 4' along the roof and then covered it with a layer of 1" boards.

There was also another slight departure on the main roof. In order to keep the costs to a minimum, I had planned to use only unplaned lumber but here, because I wanted to use asphalt shingles on the roof, it would make for a much smoother roof if the boards were planed to a uniform thickness. So here we did spend a few extra bucks on fancy trimmings.

Now, in order to complete the "Hull", all that remained was building on the rounded "stern".



*Saw these two at anchor in a little cove  
near Halifax Nova Scotia - Now that's my kind  
of boat!! - Doesn't cost anything to dream!*



The design of our dome, or to be more precise our  $\frac{1}{2}$  dome, was a bit of a departure from the norm. I do not know if anyone else has built a large dome by the method we used.

We had built several models of domes in the past and had planned to build one to use as a solar greenhouse. The models were two frequency and three frequency Icosahedrons, great for individual structures, but wouldn't suit our purpose. These structures work for either  $\frac{3}{8}$ ,  $\frac{1}{2}$  or  $\frac{5}{8}$  domes, but we needed an exact  $\frac{1}{4}$  sphere. Our structure had to fit against a rectanlinear surface (ie. a right angle).

What we did was to start off with half a Pyramid. That fit fine except for the fact that it did not fill the hole! Now, how to make it round? No problem at all. Just take two pyramids, turn one upside down, and set the other one on top so they join at the bases. You now have what is known as an Octahedron. Take an airhose and blow it up so that it becomes perfectly round, and measure all the little lines that you drew on the faces of the pyramids!

A much simpler method is to go to the local bookstore and buy a copy of **Domebook II**. In the section on Cord Factors and Angles, near the back of the book, you will find the computer read-outs on just about every kind of sphere you can think of, and a whole section on Octahedrons. (A hell of a lot easier than blowing up a couple of Pyramids!) This is the route we took. I settled on "Six Frequency Method I; This would give the structure a more rounded appearance. However, the main reason I chose it was that it "tied in" better with the supporting beams for the main roof (not structurally, but astetically). Another bonus is that because the radius is 10 feet, using six frequency, my longest strut is only 45 inches.

Another advantage is that because of the short lengths, the 2 x 4 material is free if you do not mind doing a little scrounging. I got most of mine at the local dump. The 2 x 4's were scrap ends thrown there by a company that builds roof trusses! (They were kiln dried spruce, dressed on four sides.)

The procedure followed in the construction was exactly the method laid out in **Domebook II**. Step one—build a paper model. Step two—cut and drill all the struts and make piles of the individual lengths.

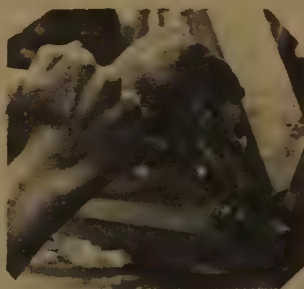
There is a lot of cutting, six frequency means twelve different strut lengths, but it is well worth the extra effort.

One very important thing to remember here is, when you cut the struts, don't forget that your cord factors give you the total strut length from vertex to vertex. Don't forget to deduct the diameter of the hub from that length when you cut the strut. In our case, this meant three inches off each strut length (**Very Important**). If you don't do this, you will get a much bigger dome than you wanted.

Step three—cut the hubs from the pipe. (I used 3 inch ABS Drainpipe. It took 2 lengths. Total cost \$30.00.)

Step four—erect the dome. Things can get pretty discouraging here, let me tell you. The first thing was that the strapping tool that I rented to attach the hubs to the end of the struts didn't work to well. The strappings has to go over the top of part of the tool so that the little "Wheel" in there can put the strap tight.

Then you clamp it. When you pull the tightening tool out, the strap is slack! We then went to work and nailed a length of strapping on each end of the struts. When it came time to attach the hubs we just passed the strap through the hub and up through the hold drilled in the end of the strut, pulled it tight by winding it up with a pair of pliers. Then we nailed it and twisted off the excess metal strap. Worked great, but you are going to get a few blister winding the strapping.



O.K., let's get building. Get your crew lined up this way— A) the "Conductor". B) the Hub section (2), C) the Holding section (2), and D) the twisting and nailing section (2). That is seven people—it can be done with less—but it will take a little longer. Teamwork is the answer. (Any more than 7 is total confusion!)

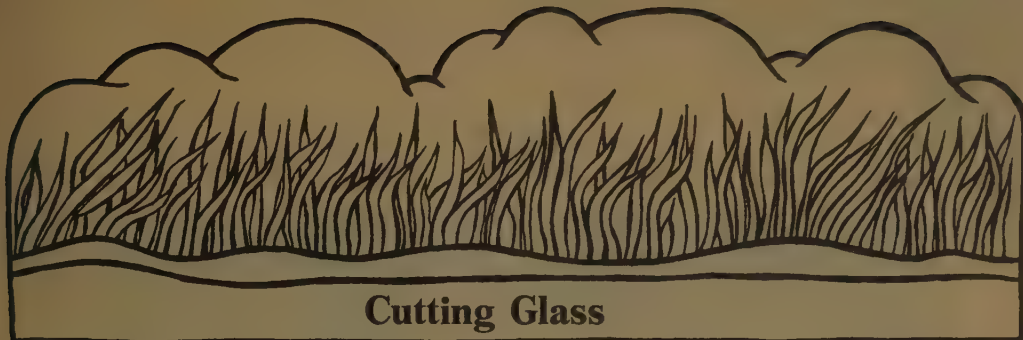
My daughter, Holly was the Conductor for this concert. "Take a number 1 with 2 hubs (one on each end). Now a number 2 with 1 hub, a number 1 with 1 hub, it goes on the number 1 with 2 hubs. Now a number 3 plain, it goes between the number 1's. (Your first triangle). Continue this process until you are finished.

The Conductor concentrates on the model and calls off the score. Without this set up, using a six frequency sphere, you would get so mixed up. (We tried it—we know!) It took us until noon to get organized and the dome was in place by suppertime.

About halfway through we were about ready to quit. The damn thing was flopping over. It would not sit flat on the floor, it was awful. I was sure I had cut the thing wrong. We were all yelling at Holly. "You must be giving us the wrong numbers!" Then, as more struts went into place, it started to take shape. When the last two struts went in you could climb all over it. It was a terrific "Concert." We all shook hands with the "Conductor." Then we went down for supper and enjoyed our structure. It was a fun day.

We measured our triangles and went and got a price on glass—\$350.00 would buy it out to fit but because of the fact that 6 frequency also means lots of different sized—it meant making patterns for the glass cutter to follow. That winter we covered the dome with 4 mil plastic sheet to make it waterproof and popped styrofoam triangles into place to insulate it. It wasn't waterproof to say the least and that winter was a rather wet one. You have no idea how much I learned to hate the sound of dripping water!





## Cutting Glass

I was faced with the task of cutting out cardboard patterns to take to the glass cutter, along with about \$300.00. Then an article appeared in *The Mother Earth News* (issue #38) entitled "Cut Costs by Cutting Your Own Glass" by Stewart Silverstein. It sounded like a piece of cake!

I had lots of glass to practice on—All the putty in those old window sashes we had bought was loose. This meant that before we installed the windows, we removed and graded the panes of glass, and using new putty, put the glass back in. This gave us a surplus of glass, but most of it "Frosted" from the sand blasting, but it was great stuff to practice on. It wasn't too long before I could get it to break along my "Score line". (Well at least close enough!) I was now an expert.

After quite a bit of shopping around the various Glass supply people, who gave me lots of tips on the Art of Cutting, I found that it is quite a bit cheaper to buy glass by the Box or crate in a standard size and cut it yourself.

The first thing I bought was a 5/8 sheet of 4 x 8 flake board for a cutting table. Then I picked up a piece of old carpet underlay to cover the table top. Next a glass cutter, and finally a box of glass—8 sheets, 3' x 5' double thick.

How I got that first load home is a whole story in itself—I'll just tell you that the glass wasn't in a "Box" but loose and that the transmission packed up on the old ½ ton I had borrowed...in the middle of 5 o'clock traffic.

We made it home with no breakage.

Now for the first cutting session. I had worked it out so carefully—I could get 2 triangles from each sheet or 16 lights per box so 2 boxes would be more than enough.

I followed the directions carefully—**Step one**—lay down the sheet of glass—**step two**—mark out the triangle with a marking pencil—**step three**—put down a thin coat of oil along the line—**step four**—lay down your straight edge along the line—**step five**—grasp the cutter gently but firmly between the thumb and first two fingers of the right hand—**step six**—using just the right pressure (not too hard—not too soft) make the score line. You should hear a musical sort of hissing sound—only I didn't! I heard TIC-TIC-TIC-TIC-TIC all the way across. **Lesson Number one**—Don't buy one glass cutter—even the best ones can have a flat spot on the little cutting wheel. Buy a couple anyway.)

On to **step seven**—snap the piece in two—WOW—it worked great—the piece was in two—Just one small problem—it wasn't where I wanted it! Let me tell you—I learned a lot about glasscutting.

I did however develop a foolproof method of cutting glass for the novice glasscutter who has to cut large expensive sheets of the brittle, breakable material.

**Step #1 and step 2** are exactly the same as before—except, mark out all the cuts you are going to make on the sheet of glass, and don't forget to make the marks so that the piece you want is slightly smaller than the opening you want to fit it into. (Very important) A felt tip marker works great. You are going to need one or two "helpers"—glass is heavy  
**Step 3**—Turn the sheet of glass over. Now the lines you made are underneath.







**Step 4**—Without using a straight edge, take your good cutter, dip the little wheel into a dish of light oil, and with a steady hand, good pressure, make your score line over the top of your mark free hand—it's not hard to do—just one long even stroke

**Step 5**—Very carefully now, turn the full sheet back over so that now your score line is underneath and your marked line is back on top.

**Step 6**—Take some pieces of scrap glass. (There will be enough laying around) and slide them underneath the sheet of glass along a line parallel to your mark and as far from the line as possible. What you have done now is put extra stress into the sheet of glass.

**Step 7**—On the end of the handle of your cutter is a little round ball—grasp your cutter between the thumb and first or index finger of the right hand (sounds like an old army training manual) at the flat area near the little wheel and go Tap Tap Tap, striking the glass along the marked line with the little ball. and there it is—a perfect cut every time!

all the pieces left over and there was quite a pile because we were cutting Equalateral and Isocolise triangles from a rectangular sheet, can be used for all sorts of things.

We were able to get a great pile of 10 x 14 panes to replace the "Frosted" glass in our window. Using Silicone glue, I made a 1 frequency sphere (all equalateral triangles the same size) that makes a real neat terrarium. Also a pyramid that we used for root cuttins—and I still have a bunch of glass left over.

The nice thing about it is that I was able to save well over a hundred bucks by doing it myself.

## Installing the glass in the Dome

This was really a snap—well at least that's the noise one of the large pieces of glass made when I tried to force it in place—make sure you cut the panes slightly smaller than the opening you want to fill.

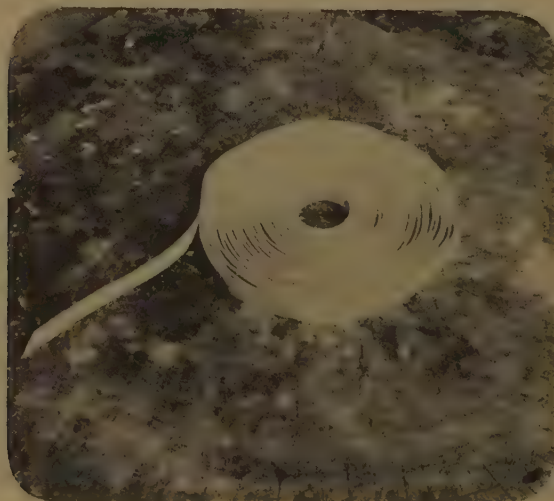
We mounted the glass by glueing and nailing in 3/4" 1/4 round moulding—then from your glass supply people get some of that magical stuff, the strip of Mastic in a big roll—it is expensive but it is worth every penny. It has a lot of advantage over putty—it doesn't harden, it sticks to the glass and sticks to the wood like you wouldn't believe. I had to break out the glass when I went to remove the triangle that cracked. I learned a lot from that session.

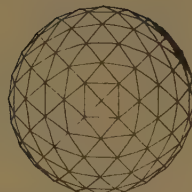
Take the Roll—unwind a length, press it on the 3/4" face of the moulding. Don't take off the paper backing until you have tried putting in your triangle of glass. If the glass is tight here and there along the edge—your glasscutter has little knotches in it—these are made especially for this purpose—using a little care you can trim the glass to fit perfectly—and don't forget—perfect means with a little space between the wood and the glass to allow for expansion and contraction.

When everything is ready and you know exactly how the glass is going to go, remove the paper backing from the mastic and pop in the glass. Remember—you only have one shot at it—if you miss—unless you are lucky, you are going to have to break the glass to get it out. Just don't try to rush it.

Once it was in place I put a band of silicons around the edge to make a seal between the glass and the wood.

Sure it is much more expensive than putty—but—as I said earlier—you have no idea how much I learned to hate the sound of dripping water—and if done properly—this stops it!

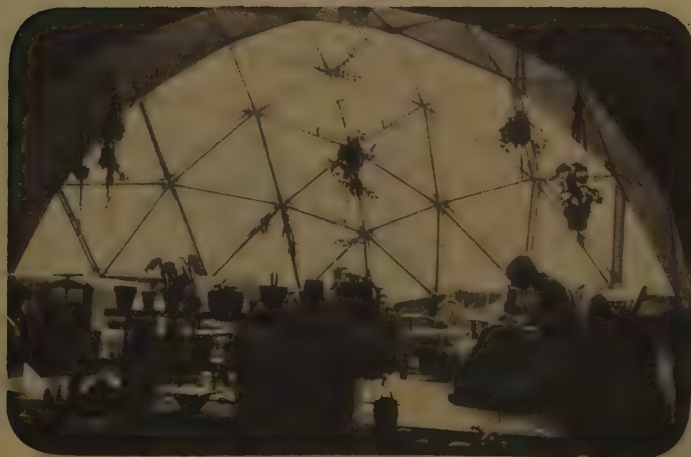




6-FREQUENCY OCTAHEDRON

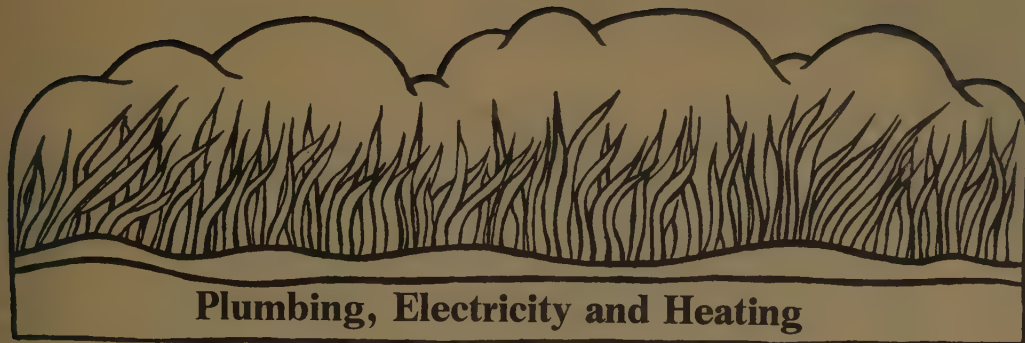
CLASS I  
METHOD 1

|        |     |     |          |
|--------|-----|-----|----------|
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| LENGTH | 2,1 | 2,0 | .3203644 |
| LENGTH | 3,1 | 3,0 | .3319301 |
| LENGTH | 3,2 | 3,1 | .3779644 |
| LENGTH | 4,1 | 4,0 | .2960307 |
| LENGTH | 4,2 | 4,1 | .3851750 |
| LENGTH | 5,1 | 5,0 | .2419696 |
| LENGTH | 5,2 | 5,1 | .3319301 |
| LENGTH | 5,3 | 5,2 | .3779644 |
| LENGTH | 6,1 | 6,0 | .1970752 |
| LENGTH | 6,2 | 6,1 | .2654663 |
| LENGTH | 6,3 | 6,2 | .3203644 |
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| AXIAL  | 0,0 | 2,0 | 2,1      |
| AXIAL  | 0,0 | 3,0 | 3,1      |
| AXIAL  | 0,0 | 3,1 | 3,2      |
| AXIAL  | 0,0 | 4,0 | 4,1      |
| AXIAL  | 0,0 | 4,1 | 4,2      |
| AXIAL  | 0,0 | 5,0 | 5,1      |
| AXIAL  | 0,0 | 5,1 | 5,2      |
| AXIAL  | 0,0 | 5,2 | 5,3      |
| AXIAL  | 0,0 | 6,0 | 6,1      |
| AXIAL  | 0,0 | 6,1 | 6,2      |
| AXIAL  | 0,0 | 6,2 | 6,3      |









## Plumbing, Electricity and Heating

As I mentioned earlier in the book, only the drain system is under the slab. I was afraid that if I put the pressured water underneath and there was a break, or an elbow that wasn't soldered properly... We would be in big trouble. There is lots of space to run your pipes overhead, through the spaces in the combination roof trusses and ceiling joists. If you have a problem—it is easy to get at. Your pipes down to the water fixtures...can run through your 2 x 4 partition walls.

The same thing applies to the electrical wiring. The only thing here that is a "problem" is the "Cordwood Wall"—You can't run your wires through it without a great deal of difficulty.

If you don't like the looks of a wire running down the wall to a switch box—you could run "conduit" under the slab and "Fish" the wire through it.

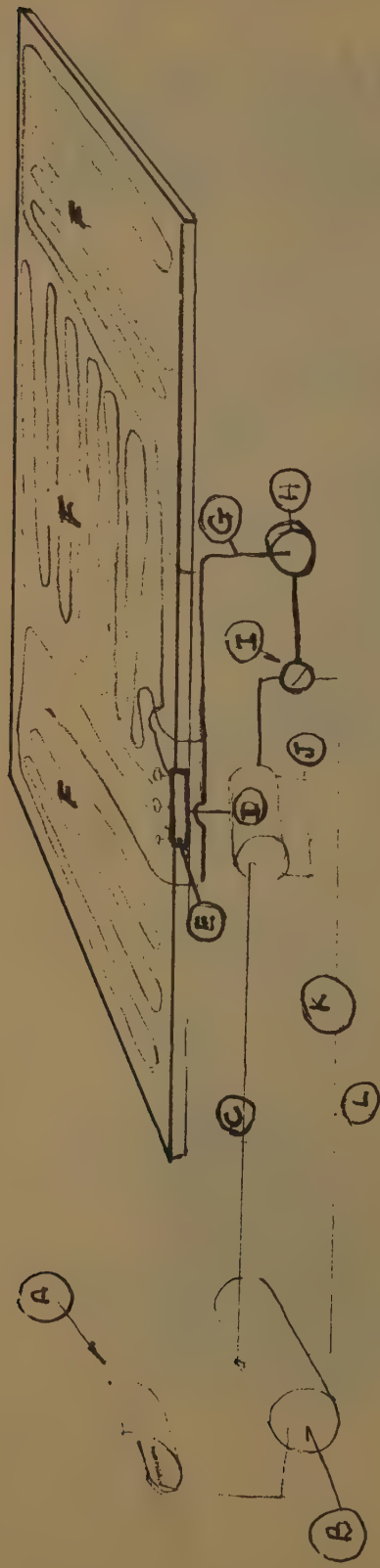
I felt that this would be expensive—and—you would still have wire exposed, only it would be running up instead of down. Besides—you don't notice it after a while—especially if the color of the wire doesn't conflict with the color of the wall.

Right now we are running on a temporary set up that is actually working quite well. We have a wood burning cook stove that also heats our domestic hot water. There is a real neat wood burning space heater that was built prior to 1900 and works like a charm. In the bedrooms we have 1500 watt portable electric baseboard heaters. This is where our big expense is. They will have to go.

Actually though, the bills are not too bad when you compare them to what people are paying to heat a similar space. In the summer, our hydro bills run between \$12.00 and \$15.00 per month. In the winter, with the heaters on, it jumps to between \$45.00 and \$50.00 per month. We pump our water, run the washing machine just about every day, there is also the deep freezer, the refrigerator, the T.V. and of course the lights, so we can't really complain.

What I plan to do is lay a network of 3/4 inch plastic pipe on top of the slab. These pipes would be laid out in different circuits for different areas. The whole thing would then be covered with 2 inches of concrete. Then water at about 90 degrees would be circulated through the system. That mass of concrete with all those steel rods in it should make an ideal "heat sink" and once it is warm it should stay warm for quite a while.

The plan is to pre-heat the water with a solar collector and store it in a large tank buried under a proposed greenhouse. From that tank it would go to a final heater and brought up to the required temperature. That water would then be circulated through the network of pipes in the floor. With a little luck and lots of sunshine I won't have to use too much energy to raise the water temperature to the desired amount. I don't think I'll get that lucky that I'll have to cool it down—but wouldn't that be great!



A - "Hot line" type Solar collector-

B - Storage tank buried under Green house

C - insulated preheated water line

D - Water boiler (with pressure relief valve)

E - Water manifold with valves to control flow to each section or circuit

F - 3/4 inch plastic pipe laid on slab and covered with 2" cement. Each circuit has its own air bleed.

G - Common Return line

H - Thermoslastic controlled circulating pump

I - Thermo controlled two way valve. When Temp in (G) is greater than in (C) water will go directly to (D)

J - Thermocouple wire between (C) and (I) control

K - Return line to underground tank (B)

L - Connection to domestic water supply to charge system

By adjusting valves in manifold (E) you should be able to direct flow to area of greatest demand  
By putting the circulating pump (H) on the return side, you should have a better control on the line pressure

## Patching Chinking and All That Jazz

As I mentioned earlier in the section on Construction—the secret word is **Dry** but no matter how careful you are—you are sure to get some shrinkage in your blocks.

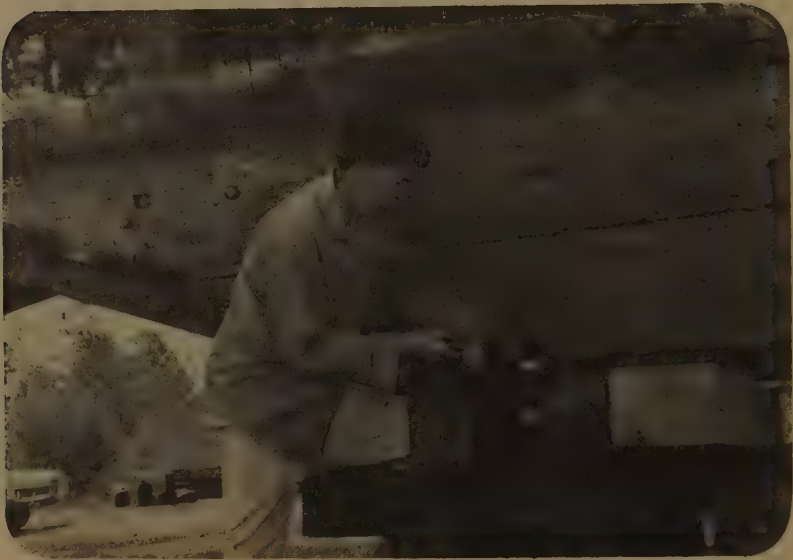
We were under a time factor and had to build really before we were ready or at least the blocks were ready and shrink they did.

I tried everything to chink up the spaces between the mortar and the blocks where it was required—forcing in a loose or sloppy grout of lime and fine sand, I'd even developed a special tube to fit a slightly modified caulking gum. I tried wetting down the crack—I tried everything. They all worked to a certain extent some methods better than other—but nothing I was really happy with. I just couldn't seem to get the grout in deep enough.

Last spring the Provincial Dept. of Transport, who owned a number of old wooden Ferry boats, cattle scows and what-nots had found them "Takin' on water" to use the nautical term. (to the land lubber this translates into—"They were sinking") so they had to be pulled up on shore to see about repairing them. I was contacted by them to see if I could give them a hand for a week or two. I guess they figured that if I was building an old fashioned house, I should be able to work on an old fashioned boat.







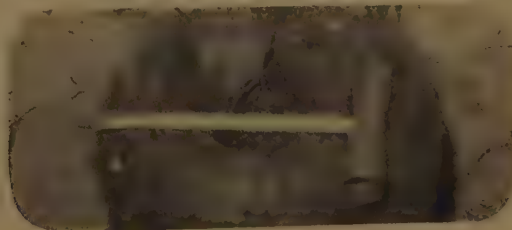


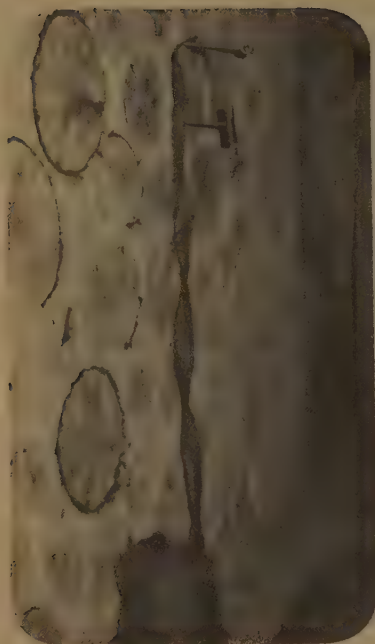
My son John and I joined the crew the next day and were introduced into the ancient and noble art of "Corkin" as it is called.'

The "Boss" was a real fine man, Ervin Corscadden from 'Down Mace's Bay Way'. Ervin had been around boats all his life, an old time lobster fisherman and his father before him. He was a great man to work for and showed us all the tricks of the trade. How to use all the different tools, driving irons, Setting irons, horseing irons, all used to tuck that magic ingredient OAKUM into the leaking seams. How to curl it, ravel it, pound it, tuck it—to watch him do it—it is an art, and then Pitchin' the seams and settin her afloat—It was terrific.

The couple of weeks stretched into a couple of months. I took time off to do a couple of air shows and missed the "Lanchin's" but we completed 3 boats, had a great time and learned a great deal. I've included here a couple of "shots" of the operation just for general interest, because it did give us the answer to our shrinking problem—OAKUM—the interesting thing is that when I checked to see what the old timers used—this was it.

Helen took on the job of chinking around the blocks and after much trial tribulation experimentation and blisters found the ideal tool for the purpose—the combination sparkplug socket, screwdriver and bar wrench for my chainsaw. It worked perfectly.





**Patching** is another subject but again with this type of wall no problem. For example—if you want to change the position of a door or window, the first tool you use is a 8 lb sledge hammer. I do not exaggerate—this is what is required to break down the wall. Then you take a mason's hammer and chip the mortar back to give yourself some working room, put in your new door frame, window frame or whatever, propped in place, soak the mortar where you broke it out and fill the space back up with the blocks and mortar again.

If you find a portion of the wall where the mortar has crumbled due to freezing before it set properly. (We found several spots where this happened—so now if the temperature is going below 45 degrees (F) we don't lay blocks.) Anyway—it isn't any problem, just extra work—chip cut all the crumbly stuff and wet down the cavity and sock in a new batch of mortar.

If you find a block of wood that has gone "punky" (watch out for Birch, it can fool you), simply "punch" it out and stick in another block.

If you want to change the whole appearance of the place, staple on a bunch of "chicken wire" and apply stucco all over the wall. It looks great although I prefer the round ends, they look like stone.

## If We Had To Do It All Again

While our building costs are very low compared to “conventional” construction, (by at least \$20.00 per sq. ft.) we know now that we could have done the same thing for a lot less. Our big problem was that we had to have a house in a hurry.

After spending the first summer and winter in the old school, the owners asked us if we could move out. We decided that the best thing to do was to go camping. The warm weather had started—why not?

That summer we moved into a regular little “tent city” out behind the site. It certainly made it handy to get to work. Tenting is fun when you want to do it, but summer has a habit of turning into Fall. When you *have* to do it, camping is something else again, especially when you get up in the morning and there is a half inch of frost all over the tent! That’s camping!

We really “pushed” to try to beat the coming winter and just barely made it. We were able to move in before it really turned cold.



Because of the “push” and, the fact that our money was tied up in the timber we had cut, our blocks were not as dry as I would have liked them to be. If I had to do it again I would go to ~~the~~ fire-killed wood, the dead elm, the windfalls or even old telephone poles. Not only would the material be dry and shrunk, the only cost would be trucking expenses and chain saw fuel. So that would be big saving number one.

We had the extra job of “chinking” around a lot of the blocks with Oakum, because of the fact that they shrank and became loose in the mortar. As I mentioned earlier in the section on patching, it isn’t all that difficult to do—just extra work.

Another way to cut expenses would be to buy your hydrated lime in bulk. There is a slight problem though—you have to take a truck load—a 10 ton truck load. This would be great if you could figure out what to do with what’s left over.



A good way to save if you happen to be near a cement plant or lime kiln is to gather together a truck load of 45 gal. drums and make arrangements with the producers to pick up their spills.

A word of caution here though—buy a good filter mask—otherwise you won't make it, you will cough yourself to death. This is if you are really up against it dollarwise. Your costs, by the bag, still aren't that high when you compare it to standard construction.

Size when you build a model on the scale of  $\frac{1}{4}$  inch to the foot it doesn't look very big—when you go full size—it's a whopper. If we had to do it again, we would build much smaller. Our place is huge—much more than we really need. However in spite of its size it still has a very "hommie" feeling. And room! Have we got room! Last New Year's Eve we had a small party—39 people—and 22 slept over. That's room!

As I mentioned in the section on construction, I would go to a longer block, at least 12 inches. This is only because I think it would be easier to build the wall vertical. You wouldn't use any more mortar with a 12" wall.

The next thing I would do differently is the curve on the ends of the "wings". The curve I built is too tight, I used an eight foot radius, it is difficult to build. I should have gone to a 10 foot radius. The wall under the dome is a 10 foot radius and it was no problem. Not that the 8 foot radius is a problem; just a little trickier to do.

When you come right down to it, I'm glad we did it the way we did. Sure we made mistakes, but there is nothing wrong with making mistakes as long as they were not made intentionally. When they stop putting erasers on pencils then I'll start worrying about making mistakes. We learn a lot from them, and the only thing we lose is a little time and effort.

If I do it all again, and I probably will—not because I have to, but because I want to, I would build something quite different.

I have come to the conclusion that the easiest structure to build is to go right back to the front of this book and build a house the way they were first built, that is, perfectly round. I've included a couple of sketches of this type in the next section.

My "theory" about round corners is very basic.

Let's assume you are out in the cold and you lose a glove. Without even thinking, you naturally make a "fist" or ball with your bare hand.

Now—fight your natural instinct—stick out one finger. Your whole hand will become cold trying to keep that one finger warm. Leave it sticking out long enough—your whole body will eventually become cold.

The same thing applies to a building. The square corners stick out like a sore thumb (or a cold finger as the case might be.)

Your house gets cold trying to keep the corners warm. This problem is compounded by the fact that the "mass" of the corner, due to "conventional" construction methods, is usually much denser than the walls that join there. Round off that corner, keep the thickness of the wall uniform and your problems with heat loss are greatly reduced. The only reason the wall that covers your body (skin) is thicker on some parts than on others is because some parts are subjected to more wear than others—not to keep that area warm.

Contrary to what most people believe—the reason that anything gets cold whether it is in your freezer or outside exposed to the elements, is due to the fact that it **loses its heat, not because it absorbs the cold**. In other words—HEAT flows TOWARDS COLD—not the other way around.

As final proof to the theory that the sharp corner is bad news to heat retention—

Did you ever see an Eskimo with a long straight nose? How about a square egg? or an air cooled engine that had a smooth outside finish on the cylinders?

When you can show me these things—I'll believe in square corners for dwellings

# Design



"Ya got the right idea Hop Sing - but I think ya might have a bit of trouble supportin' the Roof!"  
Jr.

## 2 Bedroom - 15' Radius - 707 sq ft.

14' Dia. Blown Acrylic Dome Sky light. It is expensive but total cost of building is still very low. A  $\frac{3}{8}$  Geodesic Dome would save a lot of money.

There is a ladder up the Block wall around the indoor garden to a "Loft" build over the corridor, (about 3' wide) Can be used for extra sleeping area or just a place to go and gaze at the stars.

The Arches inside would give the place the feeling of an old castle and the curved walls give the feeling of much larger size simply because you can't see all that far. Sort of an "Optical Confusion" (or something)

That sunken tub is 3' wide and 6' long and as deep as you want to make it.

This should be a real fun place. I think I'll try it next. JH.



A = Arch

To make "Arches" - Cut  $\frac{1}{4}$ " plywood in strips equal to width of wall. Bend Plywood to 1" board for spreaders and prop in place. Build wall around. When curved remove form.

The wall on this drawing is 12" thick.



## 2 + Bedrooms

Blown Aerobic Dome for Skyline over Kitchen.

using a 9" block - less than 5 cords of wood required to build exterior wall

The heavy lines on the interior are 6" blocks for structural strength only the block wall around the Kitchen area is necessary. The others are just for effect.

Less than 3 cords of wood required.

Total 8 cords packed pulwood @ \$4000  
\$ 32000 plus lime cement and sand.

In the winter - install a door flush with exterior wall at Entry. This would give you an Air lock effect.

ff



Your maximum on this one would be about 18' Radius. The corridors would be 36" wide. Total area 1018 sq ft. (If you want to 20' Radius you would gain 289 sq ft.) Measurements are based on 18' rad.

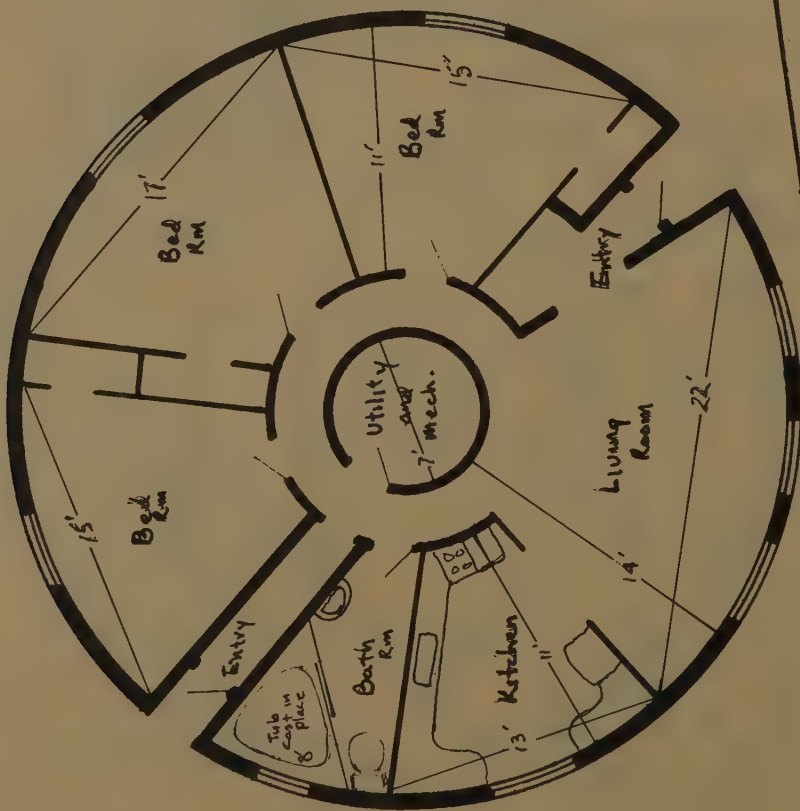




### 3 Bedroom

18' radius

1018 sq ft.



This layout would probably give you the most house for the least money. I designed this place as the ideal type for a low cost housing project. The problem was that the "Powers that Be" think "Square" and it was turned down—in spite of the fact that by using the "Stackwood" method of construction, it would have cost about \$20,000 less than what they are putting up for a 3 bedroom "low cost" housing unit!

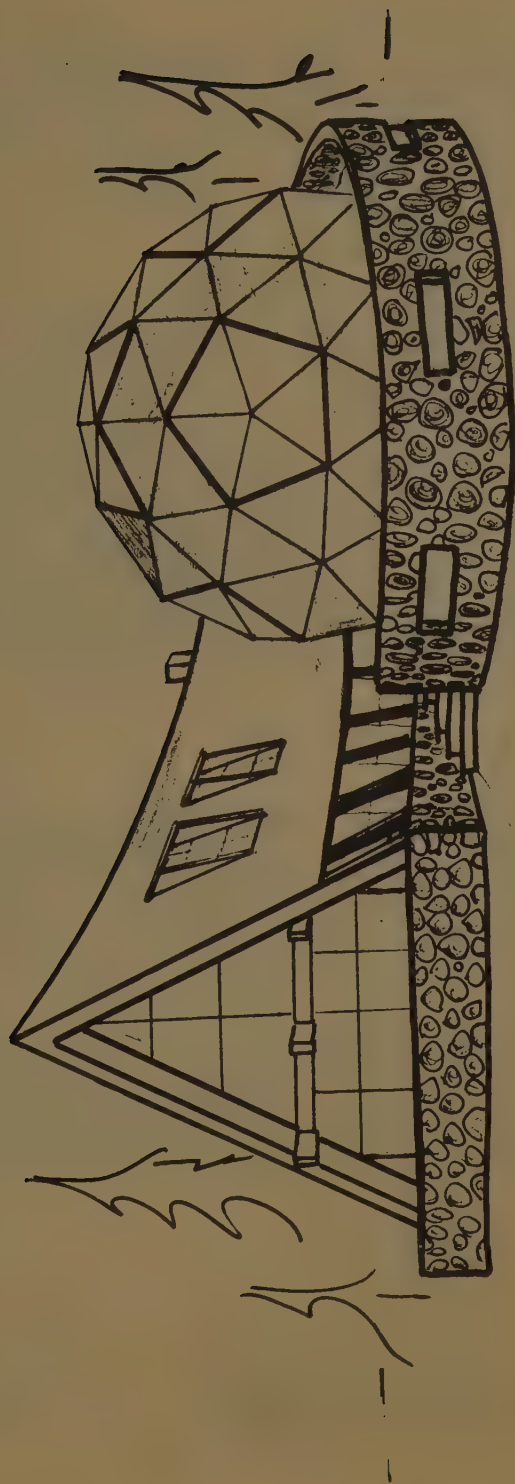
One big advantage of the Round house is that it is aerodynamically sound—(there's a 50% wind for you!) This means that it offers very little resistance to the wind and thus is easy to heat. The cold wind just rolls on by.



Note: All of these designs use the "Clivus Multrum" or the "Humimat" system's for treatment and disposal of organic household wastes. Check them out - They both make a lot of sense.

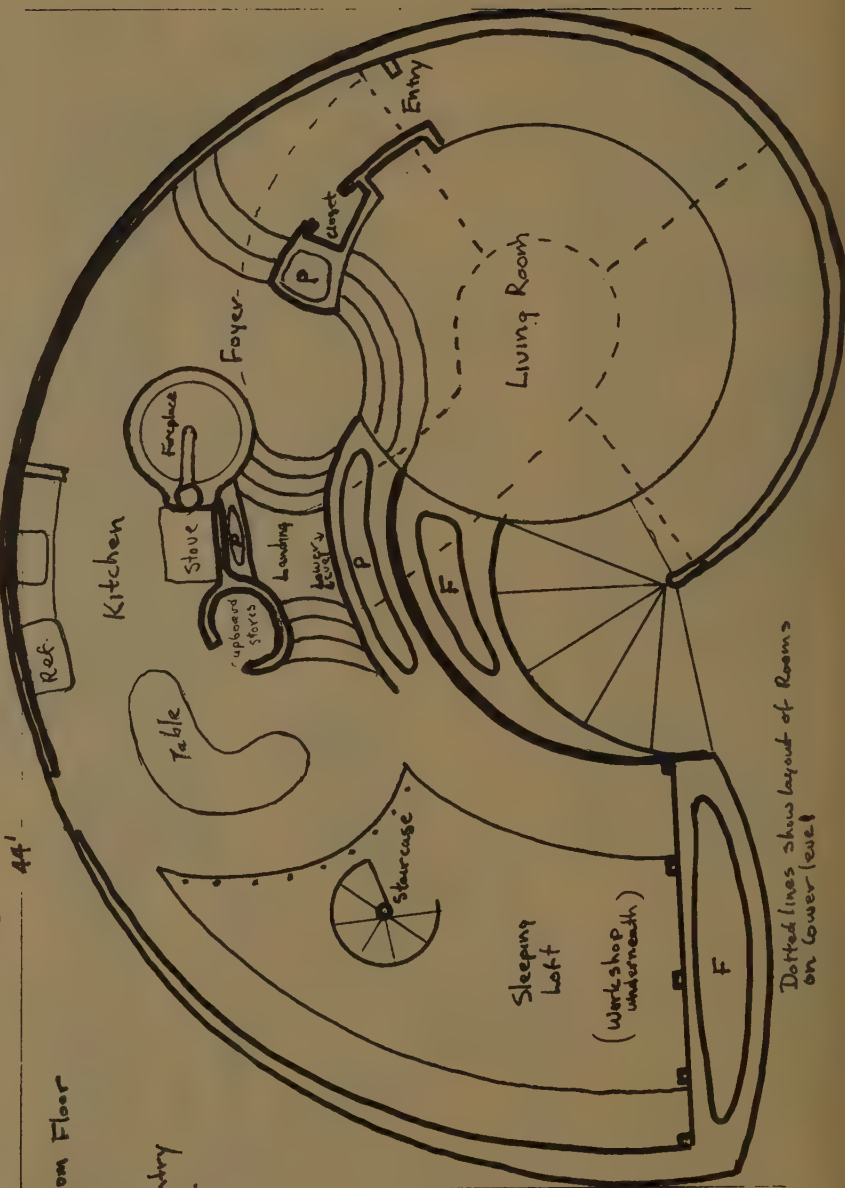
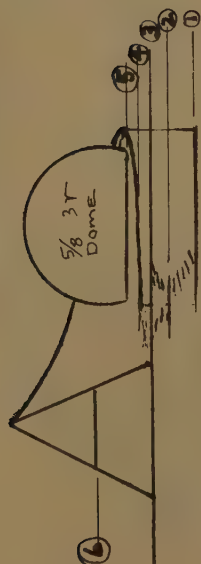
Clivus Multrum  
14 A Elliot St  
Cambridge, Mass.  
02138

Humimat Ltd  
9403 120th St  
Delta BC Canada  
V4C 2P3



# The Nautilus

You could have some real fun pouring the different floor levels. Start with lowest - build up walls to next level - fill with sand pour again - build more wall - more sand. Before final pour, make imprints in sand - Hand prints, Foot prints, lay down - make final pour. One get, dig out sand - what a fancy Ceiling you are going to have down stairs! That curved roof is built the same way as building the curve in a ship's hull.



- ① Bedroom + Washroom Floor
- ② Landing
- ③ Ground level
- ④ Incline to Main Entry
- ⑤ Living Room Floor
- ⑥ Loft

F - Flower Box (outside)  
P - Indoor Planter

Dotted lines show layout of Rooms on Lower level



The Big Logging Operation !!



The trees were cut down and limbed, and skidded to the logging road. They were then peeled and rolled into piles. The photos are a little Fuzzy- Flydope on the lens! We had to put the stuff on everything! Caught a couple of small ones trying to carry off the Chain Saw !! (Have we got mosquitoes in New Brunswick !!!)





Check list - Chainsaw - Level - square -  
Rubber gloves - Cement - Lime - Blocks -



Cement mixer - Screen for sand -  
measuring buckets - sand - Check!



Pick em up and lay em down  
(in the woods) (at the site)



♫ " - And the great big Saw came nearer - and nearer - and nearer - " ♪  
That's Raymond on the "Throttle" - Bob Corbett looking on - and Gene hidin' in back !!

Up goes the  
Scaffolding to  
support the Joists



Facing our 1st Winter -  
Decided to build a  
plastic covered enclosure

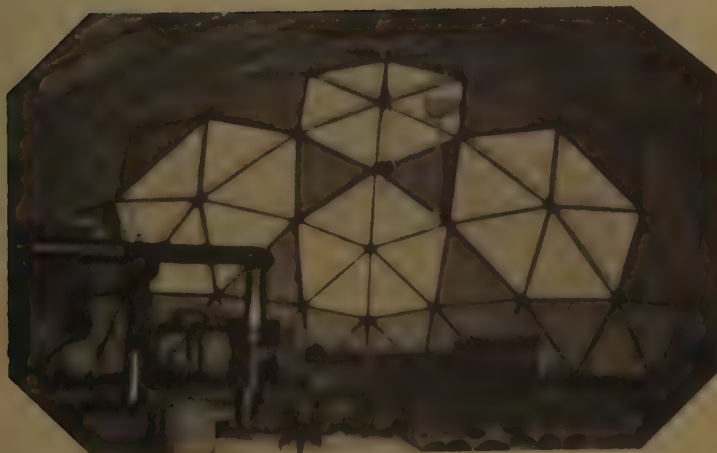
Looks sort of weird  
but it worked !!  
We found out that it's  
better to wait for  
warm weather to  
build - if you are  
not pressed for time.





We were almost  
ready for our  
Second Winter

Ready or Not -  
Here it Comes!



Outside - at night,  
with the lights on  
it looked like a  
huge SPACE SHIP  
Sitting in the dark!





The plastic cover made it through the winter intact !!



Logs - cut in half - gave us the steps up to the "Flight Deck". They are nice to sit on too. That's a little "Cubby Hole" for storage underneath.



We hung the airplane up as a sort of joke - but then we decided that it was an ideal place to store it. What a MOBILE !!

### SUPER BABY LAKES

LANDING SPEED 55 MPH. SPAN 10'0"  
CRUISE SPEED 135 MPH. HEIGHT 5'0"  
TOP SPEED 165 MPH. LENGTH 15'0"  
EMPTY WT. 610 LBS.  
GROSS WT. 850 LBS.  
STRESSOR 80's ±



RATE OF CLIMB 3000 FPM. (1st MIN.)  
POWER PLANT LYCOMING 115 (100 125)  
1' 2' 3' 4' 5' 6' 7' 8' 9' 10'



This is what she is going to look like when completed. Aint she a Beauty!

(Hang in there Harvey - I'll get 'er done yet!)

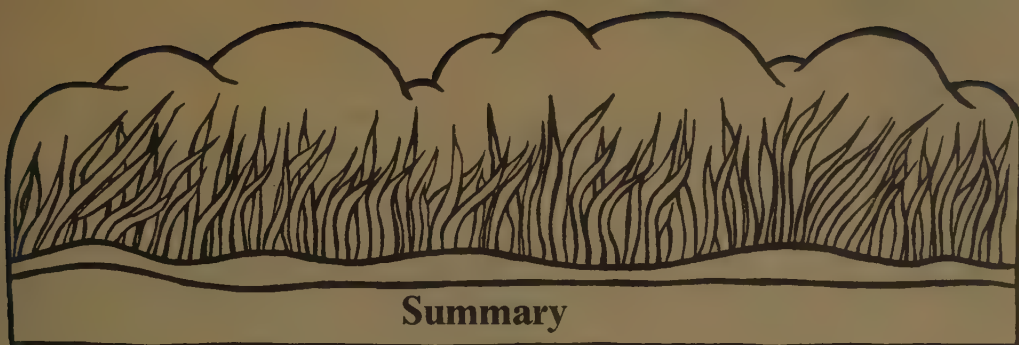
Harney Oldfield Aircraft Company P.O. Box 6074, Cleveland, Ohio 44101



Now you can see why I want to finish building  
the "Baby" - Beautiful, uninterrupted space -  
of course - flying the plane is going to be a "rush" too!







It has been quite an adventure designing researching and building this house. I've done a lot of different kinds of work, but I don't think I have enjoyed anything as much as this project. It is very satisfying to find that a wild idea turns out much better than you thought it would, especially when a lot of people said that it would be foolish to even try. There were times when I thought they were right!

I had a lot of help along the way. First my family, who had to suffer through the wind whistling through the walls in the old schoolhouse, the wet and frosty nights in the tents, and that first winter in here without shingles on the main roof and water water everywhere. But it was a great education. We now know what the Pioneers had to go through, and really, it didn't hurt us all that much. You don't really know what it is to be comfortable if you have never been uncomfortable!

I owe a great deal of thanks to a lot of other people, some of whom I've mentioned earlier in the book, and others like Tom Fisher, Zoel Thibodeau, Mac Armstrong, Fernie Richard, Art Hersey, Ron Maillet, Pete and Danny Richard, Gene Brooks and the boys at the sawmill—I realize that the names don't mean too much to a lot of you people reading this—and this list could go on and on. Not just the people who helped lay the blocks, mix mortar, drive the nails, but also the many, many people who stopped by to ask questions, give encouragement offer suggestions and just be neighbourly. I owe them all a lot of thanks. I just wouldn't feel right if I didn't mention them.

To you people who decide to build a house using the suggestions I've put forth in this book, good luck, and I hope you will enjoy the work and enjoy the house as much as we do ours. Be sure to drop me a note and let me know how you are making out.

Before we go—there is a couple of books I would suggest you try to pick up—**DOMEBOOK 2** and **SHELTER**—available from **MOTHER'S BOOKSHELF**.

**MOTHER** stocks over 500 more titles that will teach you the skills needed for self-sufficient living. Just send your name and address to **MOTHER'S Bookshelf**, P.O. Box 70, Hendersonville, N.C. 28739. They will send you their complete catalog...fast and free!





Primitive societies, so-called, may be more enlightened about making information available than does our own so-called advanced society.

Although a primitive society may have less information, it shares what it knows with all of its members, because it is needed to ensure survival of individuals and the tribe. Therefore everyone must be given all the basic information needed for survival. There are fewer specialists and therefore fewer special kinds of information to be developed and shared.

Our society has many specialists with specialized information. They become departmentalized and bureaucratized so much that the ordinary citizen cannot get information, despite all the sophisticated communications equipment and techniques. But the biggest block to getting information is the bureaucratic attitude that information is somehow the privilege of those who hold it, rather than the right of every citizen.

We often blame our political and civil service bureaucracies for being the greatest obstacles to our right to get information. I believe the blame is deserved. But I also think that they are just symptoms of our problem. The real problem is our society's attitude that only certain people should, after all, have access to certain information.

And so we say that certain information is for adults, and other information is for children. We say that civil servants should be able to keep secrets from the public. We say that privileged information should be written in strange languages (Latin or bureaucratic or legal jargon) and be interpreted only by priests, lawyers, teachers, deputy ministers or other specially trained and protected super citizens. Then we pretend that everyone has access to the information by creating Information Services, cabinet ministers' tours, press conferences, electronic gadgetry and multi-media extravaganzas which only generate smoke screens to hide the real information or distract people's attention from their search for truth.

**Editorial by David Malcolm  
the plain dealer  
February 25, 1977**

# Indigenous Material Housing Institute

Box "H", Upper Gagetown, N.B. E0G 3E0

11/05/79

## CORDWOOD UPDATE

Dear Reader:

A lot of good things have happened since we built our Cordwood Home. Our house still isn't finished in the true sense of the word - but it is very comfortable - more than adequate as far as space is concerned - and a real fun place to live in. We are very pleased with the way things have worked out.

The one thing that makes us really happy is seeing and hearing about the increasing number of people who have been able to experience the same adventure, and to know that we along with others, helped serve as an inspiration to them, helped them over the rough spots, and allowed them to experience the same feeling of accomplishment that we do.

We certainly didn't do it all by ourselves - that's for sure - as I said before - we only helped play a small part in turning people on to the ancient technique of piling short Log Ends in Mortar to make a wall. A tremendous amount of credit goes to people like Rob Roy, author of "UNDERGROUND HOUSES" and "HOW TO BUILD LOG-END HOUSES" - Francois Tanguay, who wrote "LA MAISON DE BOIS CORDE", the University of Manitoba and their book "STACKWALL - HOW TO BUILD IT" - (and I hear that there are several other good books on the subject that should be making their appearance soon).

A lot of credit has to go also to a number of publications like THE MOTHER EARTH NEWS, HARROWSMITH, FARMSTEAD, NATURAL LIFE, SNOWMOBILE CANADA, HOMESTEADERS NEWS, BITTERSWEET, etc., who featured articles on the subject - and let's not forget the newspapers, radio stations and the TV networks and their coverage.

But the real Heros are the people out there that have done it - and are doing it - because a strange thing happens to you when you start down the "Cordwood Road" - you suddenly find yourself helping other people - and that is when you start to realize what it's all about - that we are all only a part of the Natural Process and not the Master of it - that our "purpose" on this planet is to help one another and not to ignore, put down, or take advantage of our fellow man - that is what has made the mess that some people call "the civilized way of life".

Just take a look around you and see how that one is working - it isn't!! - why?? Old Mahatma Ghandi hit the nail on the head when he said "There is enough for every man's Need - but not enough for every man's Greed".

Another area where we have been going wrong is in our attitude towards our Housing. The "objective" has been wrong - we have been building our houses to impress the people on the Outside - (make it flashy and they'll eat their hearts out) - remember this - all the other creatures on this planet use their "housing" to enhance their lives - "Civilized" man uses his "life" to enhance his housing!

This problem reflects itself in his attitude to almost everything else he does - He invariably does it "Bass Akwards" - because he does it for the wrong reasons.

"Civilized" man is also the only creature on the Planet that "pays" for his housing, and - does not enjoy doing it.

In reality - we are only an Electronic Pulse beat away from the cave. The farther we go, the more fragile it becomes. We must make certain that our objectives are in the right direction - it could mean the very survival of the species.

It was with this in mind that the INDIGENOUS MATERIAL HOUSING INSTITUTE was founded - To research the use of material in as close to its natural state as possible, for the purpose of constructing adequate human shelter.

Just about everyone who builds with Cordwood-Log-End-Stackwall-Stovewood- or whatever you want to call it - is a member (official or otherwise) because invariably - once their structure is completed - they realize that they could have built it better - for less!! - and they also invariably tell other people how to do just that. This means that eventually we will discover the Secret-Happiness in being able to build, as the other creatures do, adequate, attractive housing, that will be simple and enjoyable for us to do - the only expense being time and effort.

So when you build your structure - let us know about it - also if you run into any problems - contact us - chances are someone has already solved it - When it is completed - don't forget to send for your "MASTER MORTAR STUFFERS CERTIFICATE" \_ (see inside the front cover). It's a "LuLu"!!

If you would like more information about the Indigenous Material Housing Institute and how you can become a part of it, the address is on the letterhead. Please write.

In the meantime - check out the pictures on the following pages and see what some of the Master Mortar Stuffers have accomplished - and good luck with your project.

"Love"

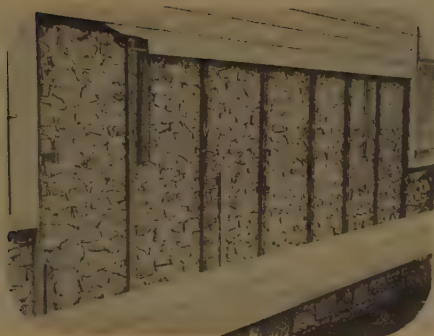
*Jack Henstridge*

Jack Henstridge, M.M.S.





Built 1855 and still in use! Norwegian American Museum - Decorah Iowa



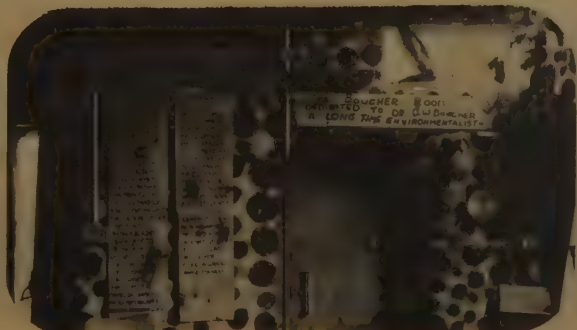
Between 80 and 100 yrs old (Barn built on later) - Riviere Verte Que



"Survival Shelter" a year round Cabin - Future workshop - Croft Selte - Bocabec N.B.

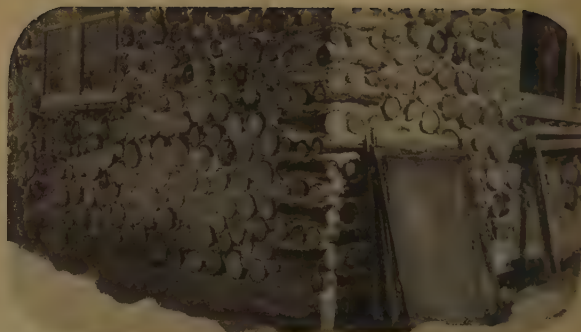


Biology Lab. built by the Students!



Sydenham High School - Ontario





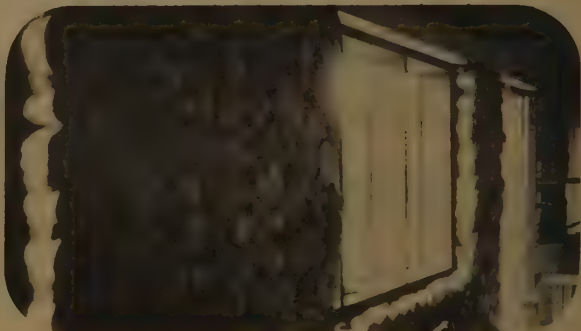
Tom and Irene Ryan's super efficient home using Poplar - Greene Maine



The "Underground House" (read his Book!) by Author Rob Roy West Chazy NY



Gus Gallant and Bonnie Pond built this one at Madran N.B.



Richard Green and N B Housing Corporation Scotch Settlement N.B.



Cliff Shockey's first house - using a "Double Wall" (telephone poles!) He had



enough left to build a second structure - again Double Wall - Vanscoy Sask.



Conduwood for a permanent "banking"

The Dutch Drive Inn Mauderville NB



Greene and Callie Hippiis used Split Pine blocks - super idea! Delta Colo.

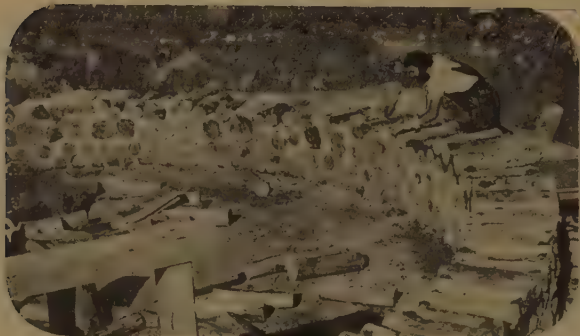




Fernie Richard's Year round Cabin



Rogersville (Pleasant Ridge) N.B.



"La Maison de Bois Cordé" par François Tanguay Inverness Quebec



Sam Felt's Fantastic Forty Foot "Fortress" underway at Adel Georgia



The House on Page 83!! by Madeline and Bernie Curran Chesterville Ont.





Replica of an old time Grist Mill - (Canada Works project) Debec N.B.



M.O.F.G.A. Demonstration Building

Fair Grounds

Litchfield Maine



New addition to old house at "La Ferme" Euclide Bourgas Cocagne NB



Log-ends and Dome

Tom Kwiatowski

Pontau Roche N.Y.





The famous "log-End Cottage" by author Rob Roy West Chazy NY.



Traditional Gambrel Roof design - a beauty! J-hue Chaisson Ste-Rosette NB



"Fort Miller" - the first Cordwood Home built within a "Zoned" area!



Malcolm and his family deserve a lot of credit. Fredericton N.B.



*ENVIRONMENTAL COEXISTENCE*





09-AHR-759